

THE

JIMEX/SINCLAIR 2068

ROM MANUSCRIPT

by

Dr. Lloyd Dreger

Machine Code and Assembly Language
(with notes and comments)
and

Cross References to the Sinclair Spectrum

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SUBROUTINE TABLE		ADDR	
ADDR			
BASIC		2499/09C3	CLEAR ATTR
0000/0000	WIPEOUT (PLUGIN)	2518/09D6	FIND CL ADDR
0008/0008	ERROR	2535/09E1	SCROLL WAIT
0016/0010	PRINT CHAR (WR CH)		
0024/0018	GET CHAR	I/O-2	
0032/0020	NEXT CHAR (NXT IS)	2562/0A02	K-DUMP (COPY)
0040/0028	CALC FP	2595/0A23	COPY PR BUFFER
0048/0030	INSERT BC SPACES	2613/0A35	CLEAR PR BUFFER
0056/0038	UPD-KEYBOARD	2634/0A4A	PR LINE (PRSCAN)
0079/004F	PHLAF	2690/0A82	EDITOR (EDIT-K)
0083/0053	ERROR-2	2791/0AE7	INSERT A
0085/0055	ERROR-3 (LE3)	2831/0B0F	EDIT
0102/0066	NONMASKABLE INTRPT	2905/0B59	CUR DOWN EDIT
0116/0074	GET CHAR ADDR	2925/0B6D	CUR LEFT EDIT
0119/0077	INC CH ADR (NC-HL)	2930/0B72	CUR RIGHT EDIT
0120/0078	SAVE CH ADR (TC-HL)	2939/0B7B	DELETE EDIT
0125/007D	SKIP OVER	2954/0B8A	EDIT ENTER
0152/0098	TOKEN SPELL	3007/0BBF	CUR UP EDIT
0551/0227	MAIN KEY TABLE	3036/0BDC	EDIT SYMBOL
		3042/0BE2	EDIT GRAPHIC
K SCAN		3045/0BE5	EDIT ERROR
0488/02B0	KEYBOARD SCAN	3069/0BFE	DEL CUR (CLEAR SPACE)
0737/02E1	UPD-KEYBOARD	3086/0C0E	ECHO (EDIT COPY)
0822/0336	REPEAT KEY	3341/0D0D	DESLUG
0840/035C	K BASE		
0881/0371	CHAR CODE	EDIT	
1011/03F3	PARP (SOUND)	3357/0D1D	K-NEW
1078/0436	BEEP	3377/0D31	INITIALIZE
		3458/0D82	NEW
I/O-1		3595/0E0B	XFER DISPATCHER
1280/0500	SEND TV	3624/0E28	MAIN EXECUTE
1338/053A	CURSOR LEFT (P-LFT)	3631/0E2F	MAIN-1 (LED18)
1364/0554	CURSOR RIGHT (P-RT)	3725/0E8D	MAIN-4 (LED4)
1382/0566	NEW LINE (P-NL)	3845/0F05	SORT ERR #'S
1408/0580	PRINT "?"	3941/0F65	ERROR MESSAGE TABLE
1458/05B2	SET-AT	4432/1150	REPORT G
1523/05F3	STORE TV CHAR	4440/1158	MAIN ADD LINE (TO PROG)
1562/061A	GET PRINT POSN	4522/11AA	CHAN INITIALIZATION
1633/0662	DO GRAPHIC	4545/11C1	STREAM INITIALIZE
1808/0710	SET ATTR BYTE	4559/11CF	READ CHAR (WAIT KEY)
1855/073F	PUT MESSAGE	4577/11E1	INPUT CHAR
1910/0776	PR-TV2	4686/11EA	PUT DIGIT (OUT CODE)
1936/0790	TV FULL?	4589/11ED	SEND CHAR
1985/07D1	ERR 5	4656/1230	SELECT CHANNEL
2184/0888	TEMP R-ATTR	4669/123D	ERR 0
2214/08A6	K-CLS	4680/1248	CHAN FLAG (SEL HL)
2217/08A9	CLEAR LOWER SCREEN	4709/1265	CART CHAN
2282/08EA	CLS	4792/12B8	ONE SPACE (INS1)
2324/0914	STORE (TV) CURSOR	4795/12BB	INSERT BC SPACES
2361/0939	SCROLL (SCRL)	4810/12CA	REMGSZ (POINTERS)
2431/097F	CLS LINES (CLS-B)	4900/1324	GET LINE #

4909/132D	RESERVE SPACE(LCU2)	6724/1A44	STATEMENT LOOP(LS4)
4927/133F	SET MINIMUM(CLEL)	6725/1A45	STATEMENT LOOP-1
4942/134E	SET WORK(X-CALC)	6841/1AB9	END STATEMENT
4948/1354	RESET	6848/1AC0	END STATEMENT-2
4963/1363	RECLAIM EDIT(X-T-HL)	6872/1ADB	EXECUTE(LINE RUN)
4971/136B	SEARCH (INDEXER)	6912/1B00	REM
4980/1374	SEARCH CHAN SYS CON	6921/0B09	LINE END
		6978/1B42	ERR M
CHANS		6980/1B44	END?
5023/139F	CLOSE	7012/1B64	TEM1 TABLE
5032/13AB	RESTORE STREAM	7024/1B70	CLASS 3
5054/13BE	CLOSE CHANNEL	7027/1B73	CLASS 0
5080/13DB	SYS CONF CK CLOSE	7028/1B74	CLASS 5
5135/140F	STREAM DATA	7040/1B80	CLASS END
5162/142A	OPEN	7042/1B82	CLASS 1(TEM1)
5221/1465	OPEN CHANNEL	7089/1BB1	CLASS 2
		7097/1BB9	FETCH A VALUE
LIST		7100/1BEC	LT22
5345/14E1	LIST	7119/1BCF	CLASS 4
5441/1541	K-LLIST	7132/1BDC	EXPECT EXPRSN(DYADIO)
5445/1545	K-LIST	7133/1BDD	CLASS 8
5537/15A1	PUT STR	7141/1BE5	EXPECT 1#(TEM6)
5548/15AC	LINE PRINT OUT(LFO)	7149/1BED	SYN ERR C
5577/15C9	PRINT LINE	7151/1BEF	CLASS 10
5634/1602	SKIP SLUG PRINT	7161/1BF9	CLASS 7(SET PERM COLOR
5645/160D	FLASH A CHAR	7209/1C21	CLASS 9
5677/162D	PRINT CURSOR	7232/1C40	CLASS 3 RET
5723/165B	NEXT LINE	7238/1C46	CLASS 11
5736/1668	STORE LINE(DE-HL)	7241/1C49	CLASS 6(OPTIONAL #)
5745/1671	PRINT CHAR IN LINE	7249/1C51	STK 0
5846/16D6	FIND LINE ADDR	7257/1C59	STOP
5864/16E9	COMPARE BC(LINES)	7259/1C5B	IF
5872/16F0	FIND SUB LINE	7288/1C78	FOR
5875/16F3	FIND SUB LINE-1	7464/1D28	SKIP (LOOK PROG)
5920/1720	REC LEN(NEXT ONE)	7509/1D55	NEXT
5957/1745	DIFFERENCE	7554/1D82	ERR 1
5965/174D	DEL DE(RECLAIM-1)	7556/1D84	NEXT LOOP
5968/1750	DEL REC(RECLAIM-2)	7574/1D96	READ NEXT VAR
5992/1768	LINE # IN EDIT	7575/1D97	READ
6024/1788	PUT BC	7762/1E52	DO NORMAL READ
6037/1795	PUT LINE #(OUT #-2)	7778/1E62	ERR E
		7810/1E82	DATA
AROS		7828/1E94	PASS BY
6069/17B5	AROS INITIALIZE	7837/1E9D	RESTORE
6095/17CF	GET A LINE	7849/1EA9	CART RESTORE
6122/17EA	AROS LINE	7882/1ECA	RESTORE BC(RESTBC)
6143/17FF	AROS NEXT	7892/1ED4	RANDOMIZE
6342/18C6	AAROS	7908/1EE4	CONTINUE
		7921/1EF1	JUMP (GOTO)
SYNTAX		7940/1F04	OUT
6469/1945	SYNTAX OFFSET TABLE	7946/1FOA	POKE
6523/197B	SYN PARAMETER TABLE	7951/1F0F	GET 2 PARAMETERS
6624/19E0	TEM 38 P-SAVE	7966/1F1E	FIX-U1(FIND SINGLE INT
6625/19E1	TEM 39 P-LOAD	7971/1F23	FIX-U(FIND DOUBLE INT)
6695/1A27	SYNTAX	7977/1F29	ERR B

7979/1F2B	RUN	9680/25D0	MOVE
7990/1F36	CLEAR	9684/25D4	ERASE
7993/1F39	CLEAR BC	9700	GARBAGE (NOT USED)
8067/1F83	ERR M		
8089/1F99	GO SUB	GRAPHS	
8123/1FBB	CHECK SIZE	9731/2603	SCRM BL (SCREEN ADDR CAL
8143/1FCF	ERR 4	9764/2624	FIND POINT
8148/1FD4	RETURN	9781/2635	PLOT
8167/1FE7	ERR 7	9790/263E	PLOT BC
8171/1FEB	PAUSE	9824/2660	GET X,Y (STK TO BC)
8201/2009	BREAK?	9837/266D	STK TO A
8221/201D	DEF FN	9849/2679	CIRCLE
8320/2080	ON ERR	9947/26DB	DRAW
8401/20D1	STICK	10105/2779	DRAW STEPS
8478/211E	GET #	10110/276E	RECALC X,Y
8487/2127	READ NEXT SOUND CH	10192/27D0	LINE DRAW
8488/2128	SOUND	10198/27D6	DRAW PARAMETERS-1
		10256/2810	DRAW L
		10259/2813	DRAW LINE
SYNTAX 2			
8527/214F	UNSTACK Z		
8533/2155	K-LPRINT	EXPRESSION	
8537/2159	K-PRINT	10324/2854	EXPRESSION
8569/2179	SET TOKEN FLAG	10328/2858	EXPRESSION-1
8574/217E	PRINT SEQUENCE	10344/2868	CK QUOTE END
8596/2194	PRINT C-R	10363/2879	EXPECT 2 COORDINATES
8603/219B	PRINT ITEMS	10377/2889	INTERPRET?
8676/21E4	STR END?	10382/288E	FIND SCREEN POSN
8679/21E7	TERM?	10455/28D7	FIND ATTR
8685/21ED	PRINT SPACING	10477/28EC	PI
8719/220F	ALTER STREAM?	10488/28F8	STICK
8747/222B	INPUT	10546/2932	ERR A
8811/226B	INPUT SEQUENCE	10548/2934	FREE
8838/2286	DO LINE	10572/294C	SCAN FUNCTION TABLE
9059/2363	INPUT ASSIGN	10609/2971	SYN-QUOTE
9086/237E	ERR H	10649/2999	SYN-STRING
9088/2380	NOT KB? (CK CHAN K)	10662/29A6	SYN-BRACKET
9099/238B	READ NEXT COLOR CH	10675/29B3	JP FN
9100/238C	GROUND COLOR	10678/29B6	RND
9166/239C	CK TEMP COLOR	10725/29E5	F-PI
9147/23BB	TV COLOR (TEMP)	10738/29F2	F-INKEY\$
9182/23DE	COLOR	10790/2A26	SCREEN\$
9198/23EE	ERR K	10800/2A30	ATTR
9238/2416	TV COLOR CHANGE	10809/2A39	POINT
9245/241D	HIFLASH	10818/2A42	ALPHANUM
9278/243E	BORDER	10827/2A4B	BIN
9300/2454	RESET	10881/2A81	S NUMERIC
9426/24D2	NEW DEVICE	10887/2A87	LET #
9543/2547	SAVE, LOAD, VERIFY, MERGE	10955/2ACB	PUSH PRIORITY
		10960/2AD0	S-CONT-2
9570/2562	VIDEO 2 SCREEN	11091/2B53	PRIORITY TABLE
9575/2567	ERR J	11131/2B7B	FN
9577/2569	SKIP IT	11216/2BD0	ERR F
9657/25B9	PASS EM (BANK 254)	11337/2C49	ERR Q
9672/25C8	CAT	11369/2C69	NEXT HL (SKIP OVER)
9676/25CC	FORMAT		

IDENTIFY		13906/3652	RESTACK TWO #
11376/2C70	FIND N(LOOK VARS)	13910/3656	E TO FP(RESTACK FP)
11535/2D0F	STK FN ARGUMENT		
11604/2D54	STK VARS(GET-EL)	CALC	
11742/2DDE	ERR 3	13956/3684	CONSTANT TABLE
11792/2E10	SLICER	13974/3696	ADDRESS TABLE
11888/2E70	PUSH STRING	14106/371A	CALCULATE(CTRO)
11892/2E74	PUT AEDCB(STK ST)	14176/3760	DELETE
11915/2E8E	INTERPRET EXP-2	14177/3761	FP-CALC-2
11948/2EAC	LD DE	14184/3768	TEST 5 SPACE(ROOM?)
11954/2EB2	GET HL*DE	14195/3773	STK MEM
11965/2EBD	LET	14207/377F	MOVE FP(DUPLICATE)
12132/2F64	L ENTER	14213/3785	STK DATA
12144/2F6D	L ADD #	14262/37B6	SKIP CONSTANTS
12164/2F84	L NEW #	14263/37B7	SKIP NEXT
12200/2FA8	L FIRST	14277/37C5	LOCATE MEM(ARRAY)
12207/2FAF	POP STRING	14286/37CE	GET FROM MEM(E SERIES)
12224/2FC0	DIM	14298/37DA	STACK CONSTANT(A SER)
12358/3046	ALNUM?	14316/37EC	STORE IN MEM(C SERIES)
12363/304B	ALPHA	14331/37FB	EXCHANGE
		14344/3808	SERIES GEN(80 SERIES)
IN/OUT		14377/3829	ABS
12377/3059	STK UNSIGNED #	14381/382D	NEGATE
12457/30A9	E FORMAT	14417/3851	SIGN(UM)
12505/30D9	DIGIT?	14436/3864	IN
12512/30E0	STK DIGIT	14443/386B	PEEK
12518/30E6	STK A	14450/3872	USR #
12521/30E9	STK BC	14466/3882	GET USR BANK
12537/30F9	INT TO FP(ININT)	14478/388E	CK SYS CONF
12557/310D	*Ey	14551/38D7	USR STRING
12605/313D	LD DE(GET INT)	14696/3904	TEST 0
12618/314A	STK DE-UNSIGNED	14612/3914	TEST >0
12620/314C	STK DE-SIGNED	14620/391E	NOT
12640/3160	FP TO BC	14625/3921	TEST <0
12671/317F	GET EXP(LOG 2^A)	14630/3926	FP 0 OR 1(STK BOOLEAN)
12691/3193	FP TO A	14646/3936	OR
12705/31A1	PRINT FP	14655/393F	AND
13130/334A	CA = 10*A + C	14664/3948	STR & #
		14678/3956	# & STRING COMPARED
SUMS		14775/39B7	STR ADD
13146/335A	PREF ADD	14810/39DA	STK POINTERS
13177/3379	GET 2 #S(SUMS LD)	14820/39E4	CHR\$
13212/339C	SHIFT FP	14839/39F7	ERR B
13242/33BA	ZERO 4/5	14841/39F9	VAL/VAL\$
13251/33C3	ADD BACK	14906/3A3A	STR\$
13262/33CE	SUBTRACT	14944/3A60	READ-IN
13266/33D3	ADD	14980/3A84	CODE
13416/3468	MULT(HL*DE)	14991/3A8F	LEN
13439/347F	PREF M/D	14997/3A95	DJNZ
13449/3489	TIMES	15009/3AA1	JUMP
13564/34FC	DIV EXP	15010/3AA2	JUMP-2
13588/3514	TEST NORM	15018/3AAA	JUMP IF TRUE
13676/356C	ERR 6	15030/3AB6	END FP
13678/356E	DIVIDE	15035/3ABB	INT DIV(N MOD M)
13779/35D3	TRUNCATE	15050/3ACA	INT

15058/3AD2	X-NEG	TAPE	
15071/3ADF	EXP	0104/0068	WRITE TAPE
15150/3B2E	IN	0229/00E5	WRITE BORDER
15262/3B9E	GET ARG (ANGLE)	0248/00F8	ERR D
15301/3BC5	COS	0252/00FC	READ TAPE
15312/3BD0	SIN	0396/0189	READ BIT
15349/3BF5	TAN	0397/018D	READ EDGE
15357/3BFD	ATN	0427/01AB	SAVE/LOAD/VERIFY/MERGE
15438/3C4E	ASN	0552/0228	ERR F
15454/3C5E	ACS	0568/0238	SAVE TITLE
15461/3C65	SQR	0591/024F	SAVE DATA?
15468/3C6C	TO THE	0659/0293	ERR 2
15497/3C89	TAPE MESSAGES	0754/02F2	SAVE SCREEN\$?
15616/3D00	CHARACTER TABLE	0814/032E	SAVE CODE?
		0981/03D5	GET #
24576/6000	XFER DISPATCHER	1088/0440	SAVE TYPE 3
		1095/0447	SAVE LINE?
FUNCTION DISPATCHER		1225/04C9	SAVE ALL
25088/6200	FUNCTION DISPATCH	1238/2BE6	LOAD HEADER
25262/62AE	INTERUPT	1423/058F	VERIFY
25325/62ED	LIT3	1478/05C6	READ TAPE
25332/62F4	POP HL,POP AF	1482/05CA	ERR R
25351/6307	NONMASKABLE INTPT	1484/05CC	LOAD
25365/6315	BS MAX BANK	1765/06E5	MERGE
25366/6316	GET WORD	1945/0799	MERGE LINE/VARIABLE
25403/633D	PUT WORD	2129/0851	SAVE-CONTROL
25436/655C	WRITE BS REG	2218/08AA	AKEY
25517/63AD	READ BS REG	2265/08D9	EXIT ERROR
25605/6405	GET STATUS	2279/08E7	EX INITIALIZE
25677/644D	GET CHUNK	2390/0956	CART INITIALIZE
25694/645E	GET BANK #	2410/096A	ERR R
25753/6499	BANK ENABLE	2412/096C	NEW INITIALIZE
25886/651E	SAVE BANK STATUS	2419/0973	NEW INIT-2
25930/654A	RESTORE STATUS	2458/099A	FIND CHAN ADDR
25970/6572	GOTO BANK	2548/09F4	BUILD SYS CONF TABLE
25997/658D	BANK STATUS STACK	2636/0A4C	CALL RES REG
26062/65CE	BS-SP	2772/0AD4	SET END MARKER
26064/65D0	CALL BANK	2779/0ADB	INTERRUPTABLE RST
26252/668C	MOVE BYTES	2809/0AF9	NEXT CHUNK
26344/66E8	CREAT BITMAP	3025/0BD1	RESET BS REG
26402/6722	XFER BYTES	3103/0C1F	GET USR BANK
26647/6817	DISPATCH SOURCE	3148/0C4C	RESET SYS CONF
26600/67E8	BLANK	3317/0CF5	SET END MARKER-2
26688/6840	CHANNEL DATA	3323/0CFB	CLEAR SYS CONF
26710/6856	BASIC START	3428/0D64	INCREASE BANKS
		3460/0D84	CLEAR MAX BANKS
EXTENDED ROM			
BASIC		CHANGE VIDEO	
0000/0000	RST0 STARTUP	3504/0DB0	OPEN D FILE
0008V0008	RST8 ERROR	3623/0E27	CLOSE D FILE
0056/0038	INTERRUPTABLE RST	3726/0E8E	CHANGE VIDEO
0073/0049	STARTUP CONTINUED	3898/0F3A	CHANGE VIDEO ABORT
0079/004F	SET HORIZ SEL REG	3901/0F3A	CV END
0090/005A	XFER SET HOR SEL R		

PASSING

3907/0F43 PASSING
3965/0F7D GET GOSUB ADDR
3978/0F8A GOTO BANK
3993/0F99 CALL BANK

7424/1D00 FIX BL
7900/1EDC JP TABLE

<DISASSEMBLY OF THE TIMEX/SINCLAIR 2068>

RESTART ROUTINES and PRINT TABLES

ADDR CODE(HEX)		INSTRUCTION
START		
0000 F3	RST0 WIPEOUT	DI
0001 AF		XOR A CLEAR A
0002 11,FF,FF		LD DE, 65535 P RAMTOP
0005 C3,31,0D		JP 3377 INIT
ERROR RESTART		
0008 2A,5D,5C	RST8 ERROR	LD HL, (23645) CHAR ADDR
0011 22,5F,5C		LD (23647), HL XPOINTER
0014 18,43		JR 67 (83) ERROR 2
PRINT A CHARACTER RESTART		
0016 C3,ED,11	RST16 Write CH	JP 4589 SEND CHAR
0019-0023 FF		RST56 (NOT USED)
GET CHARACTER RESTART		
0024 2A,5D,5C	RST24 GET CHAR	LD HL, (23645) CHAR ADDR
0027 7E		LD A, (HL)
0028 CD,74,00	TEST CHAR	CALL 125 GET CHAR CONT
0031 D0		RET NC
NEXT CHARACTER RESTART		
0032 CD,74,00	RST32 NXT CHAR	CALL 116 GET CH ADDR
0035 18,F7		JR 247 (0028) TEST CHAR
0037-0039 FF		RST56 (NOT USED)
CALCULATE FLOATING POINT RESTART		
0040 C3,1A,37	RST40 CALC FP	JP 14106 CALCULATE
0043-0047 FF		RST56 (NOT USED)
MAKE BC SPACES RESTART		
0048 C5	RST48 COPYUP	PUSH BC
0049 2A,61,5C	(MAKE BC SPACES)	LD HL, (23649) WORK SPACE
0052 E5		PUSH HL
0053 C3,2D,13		JP 4909 LCU2
MASKABLE INTERRUPT RESTART		
0056 F5	RST56 UPD KEYBOARD	PUSH AF
0057 E5		PUSH HL
0058 2A,78,5C		LD HL, (23672) FRAMES
0061 23		INC HL
0062 22,78,5C		LD (23672), HL FRAMES
0065 7C		LD A, H
0066 B5		OR L HL=0?
0067 20,03		JR NZ, 3 (72) KEY INT
0069 FD,34,40		INC (IY+64) FRAMES
0072 C5	KEY INT	PUSH BC
0073 D5		PUSH DE
0074 CD,34,40		CALL 737 UPD KEYBOARD
0077 D1		POP DE

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0078 C1          POP BC
0079 E1      Pop HL, pop AF      POP HL
0080 F1          POP AF
0081 FB          EI
0082 C9          RET

ERROR 2 ROUTINE
0083 E1      ERROR-2      POP HL
0084 6E          LD L, (HL)
0085 FD,75,00      ERROR-3      LD (IY+0), L  ERR #
0088 ED,7B,3D,5C      LD SP, (23613) ERR Stack Pointer
0092 C3,F4,13      JP 4948  RESET CALC STK
0095-0101 FF      RST56 (UNUSED)

NONMASKABLE INTERRUPT CONT
0102 F5          PUSH AF
0103 E5          PUSH HL
0104 2A,B0,5C      LD HL, (23728)  TEMP STORAGE
0107 7C          LD A, H
0108 B5          OR L          HL=0?
0109 20(28), ERROR!!      JR NZ(Z), 1 (0112) SKIP RESTART
0111 E9          RESTART      JP (HL)  Error at 109 causes
0112 E1          SKIP RESTART      POP HL      DELETE to appear in an
0113 F1          POP AF      EDIT line. Correction
0114 ED,45      RET N          in ().

CHARACTER ADDRESS+1 ROUTINE
0116 2A,5D,5C      GET CHAR ADDR      LD HL, (23645)  CHAR ADDR
0119 23      INC CHAR ADDR (NC HL)      INC HL
0120 22,5D,5C      TC-HL      LD (23645), HL
0123 7E          LD A, (HL)
0124 C9          RET

SKIPOVER ROUTINE
0125 FE,21      GET CHAR CONT      CP 33  SPACE OR LESS?
0127 D0          RET NC
0128 FE,0D      CP 13  ENTER?
0130 C8          RET Z
0131 FE,0C      CP 12  DELETE?
0133 C8          RET Z
0134 FE,10      CP 16
0136 D8          RET C      CHAR Less than 16
0137 FE,18      CP 24
0139 3F          CCF
0140 D8          RET C      Error if carry set
0141 23          INC HL
0142 FE,16      CP 22
0144 38,01      JR C, 1 (0147) SKIP INC
0146 23          INC HL
0147 37          SKIP INC      SCF
0148 22,5D,5C      LD (23645), HL  CHAR ADDR
0151 C9          RET

TOKEN SPELL TABLE
0152 BF          TOKEN SPELL      ?  The last letter has 128 added

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0153	52, 4E, C4	RND
0156	49, 4E, 4B, 45, 59, A4	INKEY\$
0162	50, C9	PI
0164	46, CE	FN
0166	50, 4F, 49, 4E, D4	POINT
0171	53, 43, 52, 45, 45, 4E, A4	SCREEN\$
0178	41, 54, 54, D2	ATTR
0182	41, D4	AT
0184	54, 41, C2	TAB
0187	56, 41, 4C, A4	VAL\$
0191	43, 4F, 44, C5	CODE
0195	56, 41, CC	VAL
0198	4C, 45, CE	LEN
0201	53, 49, CE	SIN
0204	43, 4F, D3	COS
0207	54, 41, CE	TAN
0210	41, 53, CE	ASN
0213	41, 43, D3	ACS
0216	41, 54, CE	ATN
0219	4C, CE	LN
0221	45, 58, D0	EXP
0224	49, 4E, D4	INT
0227	53, 51, D2	SQR
0230	53, 47, CE	SGN
0233	41, 42, D3	ABS
0236	50, 45, 45, CB	PEEK
0240	49, CE	IN
0242	55, 53, D2	USR
0245	53, 54, 52, A4	STR\$
0249	43, 48, 52, A4	CHR\$
0253	4E, 4F, D4	NOT
0256	42, 49, CE	BIN
0259	4F, D2	OR
0261	41, 4E, C4	AND
0264	3C, BD	<=
0266	3E, BD	>=
0268	3C, BE	<>
0270	4C, 49, 4E, C5	LINE
0274	54, 48, 45, CE	THEN
0278	54, CF	TO
0280	53, 54, 45, D0	STEP
0284	44, 45, 46, 20, 46, CE	DEF FN
0290	43, 41, D4	CAT
0293	46, 4F, 52, 4D, 41, D4	FORMAT
0299	4D, 4F, 56, C5	MOVE
0303	45, 52, 41, 53, C5	ERASE
0308	4F, 50, 45, 4E, 20, A3	OPEN #
0314	43, 4C, 4F, 53, 45, 20, A3	CLOSE #
0321	4D, 45, 52, 49, 46, D9	VERIFY
0332	42, 45, 45, D0	BEEP
0336	43, 49, 52, 43, 4C, C5	CIRCLE
0342	49, 4E, CB	INK
0346	50, 41, 50, 45, D2	PAPER
0350	46, 4C, 41, 53, C8	FLASH
0355	42, 52, 49, 47, 48, D4	BRIGHT

0361	49, 4E, 56, 45, 52, 53, C5	INVERSE
0368	4F, 56, 45, D2	OVER
0372	4F, 55, D4	OUT
0375	4C, 50, 52, 49, 4E, D4	LPRINT
0381	4C, 4C, 49, 53, D4	LLIST
0386	53, 54, 4F, D0	STOP
0390	52, 45, 41, C4	READ
0394	44, 41, 54, C1	DATA
0398	52, 45, 53, 54, 4F, 52, C5	RESTORE
0405	4E, 45, D7	NEW
0408	42, 4F, 52, 44, 45, D2	BORDER
0414	43, 4F, 4E, 54, 49, 4E, 55, C5	CONTINUE
0422	44, 49, CD	DIM
0425	52, 45, CD	REM
0428	46, 4F, D2	FOR
0431	47, 4F, 20, 54, CF	GO TO
0436	47, 4F, 20, 53, 55, C2	GO SUB
0442	49, 4E, 50, 55, D4	INPUT
0447	4C, 4F, 41, C4	LOAD
0451	4C, 49, 53, D4	LIST
0455	4C, 45, D4	LET
0458	50, 41, 55, 53, C5	PAUSE
0463	4E, 45, 58, D4	NEXT
0467	50, 4F, 4B, C5	POKE
0471	50, 52, 49, 4E, D4	PRINT
0476	50, 4C, 4F, D4	PLOT
0480	52, 55, CE	RUN
0483	53, 41, 56, C5	SAVE
0487	52, 41, 4E, 44, 4F, 4D, 49, 5A, C5	RANDOMIZE
0496	49, C6	IF
0498	43, 4C, D3	CLS
0501	44, 52, 41, D7	DRAW
0505	43, 4C, 45, 41, D7	CLEAR
0510	52, 45, 54, 55, 52, CE	RETURN
0516	43, 4F, 50, D9	COPY
0520	44, 45, 4C, 45, 54, C5	DELETE
0526	4F, 4E, 20, 45, 52, D2	ON ERR
0532	53, 54, 49, 43, CB	STICK
0537	53, 4F, 55, 4E, C4	SOUND
0542	46, 52, 45, C5	FREE
0546	52, 45, 53, 45, D4	RESET

MAIN KEY TABLE (L mode-Caps)

0551	42, 48, 59, 36	B, H, Y, 6
0555	35, 54, 47, 56	S, T, G, V
0559	4E, 4A, 55, 37	N, J, U, 7
0563	34, 52, 46, 43	4, R, F, C
0567	4D, 4B, 49, 38	M, K, I, 8
0571	33, 45, 44, 58	3, E, D, X
0575	0E, 4C, 4F, 39	SYM SFT, L, O, 9
0579	32, 57, 53, 5A	2, W, S, Z
0583	20, 0D, 50, 30	SPACE/BREAK, ENTER, P, 0
0587	31, 51, 41	1, Q, A

EXTENDED MODE (Unshifted letter)

0590 E3,C4,E0,E4	READ,BIN,LPRINT,DATA
0594 B4,BC,BD,BB	TAN,SGN,ABS,SQR
0598 AF,B0,B1,C0	CODE,VAL,LEN,USR
0602 A7,A6,BE,AD	PI,INKEY\$,PEEK,TAB
0606 B2,BA,E5,A5	SIN,INT,RESTORE,RND
0610 C2,E1,B3,B9	CHR\$,LLIST,COS,EXP
0614 C1,B8	STR\$,LN

EXTENDED MODE (Letter and either shift)

0616 7E,DC,DA,5C	FREE,BRIGHT,PAPER,\
0620 B7,7B,7D,D8	ATN,{,},CIRCLE
0624 BF,AE,AA,AB	IN,VAL\$,SCREEN\$,ATTR
0628 DD,DE,DF,7F	INVERSE,OVER,OUT,COPYWRITE
0632 B5,D6,7C,D5	ASN,VERIFY,STICK,MERGE
0636 5D,DB,B6,D9	J,FLASH,ACS,INK
0640 5B,D7	[,BEEP

CONTROL CODES (Shifted diget key)

0642 0C,07,06,04	DELETE,EDIT,CAPS LOCK,TRUE VIDEO
0646 05,08,0A,0B	INV VIDEO, CUR L,CUR D,CUR U
0650 09,0F	CUR R, GRAPHICS

SYMBOL CODES (Letter & Symbol shift)

0652 E2,2A,3F,CD	STOP,*,?,STEP
0656 C8,CC,CB,5E	>=,TO,THEN,^
0660 AC,2D,2B,3D	AT,-,+,=
0664 2E,2C,3B,22	.,,;,;"
0668 C7,3C,C3,3E	<=,<,NOT,>
0672 C5,2F,C9,60	OR,/,<>,POUND SIGN
0676 C6,3A	AND,: :

EXTENDED MODE (Diget & Symbol shift)

0678 D0,CE,A8,CA	FORMAT,DEF FN,FN,LINE
0682 D3,D4,D1,D2	OPEN #,CLOSE #,MOVE,ERASE
0686 A9,CF	POINT,CAT

SYMBOL SHIFTED DIGET KEYS ARE CODED DIRECTLY

KEYBOARD ROUTINES

KEYBOARD SCANNING ROUTINE

0688 2E,2F	K SCAN	LD L, 47 (USE DIAG TECH MAN 104b)
0690 11,FF,FF		LD DE, FFFF
0693 01,FE,FE		LD BC, FEFE
0696 ED,78	KEY LINE	IN A, (C)
0698 2F		CPL
0699 E6,1F		AND 31 MASK 5 LOW BITS
0701 28,0E		JR Z, 14 (0717) KEY DONE
0703 67		LD H, A DATA TO H
0704 7D		LD A, L POSN CODE TO A
0705 14	KEY-3 KEY	INC D D+1 TO D
0706 C0		RET NZ TOO MANY KEYS
0707 D6,08	KEY BITS	SUB 8 SEARCH FOR KEY BIT
0709 CB,3C		SLR H
0711 30,FA		JR NC, 250 (0707) KEY BITS
0713 53		LD D, E FF OR PREVIOUS KEY
0714 5F		LD E, A NEW KEY TO E

0715 20,F4		JR NZ, 244 (0705) KEY-3 KEYS
0717 2D	KEY DONE	DEC L FIND ROW
0718 CB,00		RLC B FE-FD-FB-F7-EF IN CONSEC-
0720 38,E6		JR C, 230 (0696) UTIVE PASSES
0722 7A		LD A, D KEY DONE
0723 3C		INC A
0724 C8		RET Z D=FF
0725 FE,28		CP 40
0727 C8		RET Z CAPS ON
0728 FE,19		CP 25
0730 C8		RET Z SYMBOL SHIFT ON
0731 7B		LD A, E EXCHANGE D & E
0732 5A		LD E, D
0733 57		LD D, A
0734 FE,18		CP 24 SET TO NZ
0736 C9		RET D=CAPS/SYM SHIFT E=CHAR CODE

UPDATE KEYBOARD SUBROUTINE

Use diagram p104 Technical Manual

IY=23610

0737 CD,B0,02	UPD K	CALL 688 K SCAN
0740 C0		RET NZ TOO MANY KEYS
0741 21,00,5C		LD HL, 23552 K STATE
0744 CB,7E	K ST LOOP	BIT 7, (HL)
0746 20,07		JR NZ, 7 (0755) K CH SET
0748 23		INC HL
0749 35		DEC (HL) Dec Debounce Counter
0750 2B		DEC HL Back to K state
0751 20,02		JR NZ, 2 (0755) K-CH-SET
0753 36,FF		LD (HL), 255 FF TO K STATE
0755 7D	K-CH-SET	LD A, L
0756 21,04,5C		LD HL, 23556 (K STATE+4)
0759 BD		CP L
0760 20,EE		JR NZ, 238 (0744) K ST LOOP
0762 CD,5C,03		CALL 860 K BASE
0765 D0		RET NC
0766 FD,CB,30,AE		RES 5, (IY+48) DEL REPEAT OFF
0770 21,00,5C		LD HL, 23552 (K STATE) USE DIAG
0773 BE		CP (HL) p104a
0774 28,2E		JR Z, 46 K REPEAT
0776 EB		EX DE, HL
0777 2104,5C		LD HL, 23556 (K STATE+4)
0780 BE		CP (HL)
0781 28,27		JR NZ, 39 K REPEAT
0783 CB,7E		BIT 7, (HL)
0785 20,4		JR NZ, 4 (0791) K NEW
0787 EB		EX DE, HL
0788 CB,7E		BIT 7, (HL)
0790 C8		RET Z NEITHER EMPTY
0791 5F	K NEW	LD E, A
0792 77		LD (HL), A
0793 23		INC HL
0794 36,05		LD (HL), 5 RESET DEBOUNCE TO 5
0796 23		INC HL
0797 3A,09,5C		LD A, (23561) REPEAT DELAY
0800 77		LD (HL), A

```

0801 23          INC HL
0802 FD,4E,07    LD C,(IY+7) MODE
0805 FD,56,01    LD D,(IY+1) FLAGS
0808 E5          PUSH HL
0809 CD,71,03    CALL 881 CHAR CODE
0812 E1          POP HL
0813 77          LD (HL), A
0814 32,08,5C    LD LAST K LD (23560), A
0817 FD,CB,01,EE SET 5,(IY+1) KEY HIT ON
0821 C9          RET

```

KEYBOARD REPEAT SUBROUTINE

```

0822 23          K REPEAT INC HL
0823 36,05        LD (HL), 5
0825 23          INC HL
0826 3A,08,5C    LD A,(23560) LAST K
0829 FE,CE        CP 206
0831 D0          RET NC      TOKEN
0832 35          DEC (HL)
0833 C0          RET NZ      TOO EARLY
0834 3A,0A,5C    LD A,(25562) REPPER
0837 77          LD (HL), A
0838 23          INC HL
0839 7E          LA A,(HL)
0840 FE,C0        CP 12      DELETE?
0842 20,E2        JR NZ, 226 (0814) LD LAST K
0844 FD,CB,30,EE SET 5,(IY+48) DELETE REPEAT ON
0848 F5          PUSH AF
0849 01,20,4E    DELAY LD BC, 20000
0852 0B          LOOP DEC BC
0853 79          LD A, C
0854 B0          OR B
0855 20,FB        JR NZ, 251 (0852) LOOP
0857 F1          POP AF
0858 18,D2        JR 210 (0814) LD LAST K

```

TEST KEYBOARD MODE SUBROUTINE

```

0860 42          K BASE LD B, D
0861 16,00        LD D, 0
0864 7B          LD A, E
0864 FE,27        CP 39 CAPS SHIFT OR NO KEY?
0866 D0          RET NC KEY >= 27H
0867 FE,18        CP 24 SYMBOL SHIFT?
0869 20,03        NR NZ, 3 (0874) LD KEY
0871 CB,78        BIT 7, B SYMBOL SHIFT?
0873 C0          RET NZ
0874 21,27,02    LD KEY LD HL,551 TABLE 3 OFFSET
0877 19          ADD HL, DE NOTE:D = 0
0878 7E          LD A,(HL)
0879 37          SCF
0880 C9          RET

```

KEYBOARD DECODING SUBROUTINE

```

0881 7B          CH CODE LD A, E C=MODE, D=FLAGS, E=CODE

```

Use diagram p104d Tech Manual

0882 FE,3A		CP 58	B=SHIFT
0884 38,2F		JR C, 47 (0933) K DIGIT	
0886 0D		DEC C	REMOVE K/L MODE
0887 FA,8D,03		JP N, 909	TABLE 5
0890 28,03		JR Z, 3 (0895)	MODE E
0892 C6,4F		ADD A, 79	CHAR=GRAPHIC 79=OFFSET
0894 C9		RET	
0895 21,0D,02	MODE E	LD HL, 525	TABLE 2 OFFSET
0898 04		INC B	SHIFT?
0899 28,03		JR Z, 3 (0904)	FETCH
0901 21,27,02		LD HL, 551	TABLE 3 OFFSET
0904 16,00	FETCH	LD D, 0	
0906 19		ADD HL, DE	
0907 7E		LD A, (HL)	
0908 C9		RET	
0909 21,48,02	TABLE 5	LD HL, 587	TABLE 5 OFFSET
0912 CB,40		BIT 0, B	SYMBOL SHIFT?
0914 28,F4		JR Z, 244 (0904)	FETCH
0916 CB,5A		BIT 3, D	K OR L?
0918 28,0A		JR Z, 10 (0930)	K TOKEN
0920 FD,CB,30,5E		BIT 3, (IY+48)	CAPS LOCK ON?
0924 C0		RET NZ	
0925 D4		INC B	
0926 C0		RET NZ	CAPS SHIFT ON
0927 C6,20		ADD A, 32	LOWER CASE CONVERT
0929 C9		RET	
0930 C6,A5	K TOKEN	ADD A, 165	KEYWORD CONVERT
0932 C9		RET	
0933 FE,30	K DIGIT	CP 48	0?
0935 D8		RET C	CHAR<30H=UNPRINTABLE
0936 0D		DEC C	
0937 FA,DB,03		JP N, 987	CK FOR SYMBOL
0940 20,19		JP NZ, 25 (0957)	# OR GRAPHIC
0942 21,76,02		LD HL, 630	TABLE 6 OFFSET
0945 CB,68		BIT 5, B	SYMBOL SHIFT?
0947 28,D3		JR Z, 211 (0904)	FETCH
0949 FE,38		CP 56	8?
0951 30,07		JR NC, 7 (0960)	8 OR 9
0953 D6,20		SUB 32	A-20H TO A
0955 04		INC B	CAPS SHIFT?
0956 C8		RET Z	WITH PAPER COLOR
0957 C6,08	# OR GRAPHIC	ADD A, 8	
0959 C9		RET	WITH INK COLOR
0960 D6,36	8 OR 9	SUB 54	A-36H TO A
0962 04		INC B	
0963 C8		RET Z	BRIGHT
0964 C6,FE		ADD A, 254	
0966 C9		RET	
0967 21,52,02		LD HL, 594	TABLE 4 OFFSET
0970 FE,39		CP 57	9?
0972 28,2B		JR Z, 186 (0904)	FETCH
0974 FE,30		CP 48	0?
0976 28,B6		JR Z, 182 (0904)	FETCH
0978 E6,07		AND 7	DIGET 1-8 IN G MODE
0980 C6,80		ADD A, 128	CONVERT TO GRAPHIC

```

0982 04          INC B      CAP SHIFT ?
0983 C8          RET Z      SHIFT OFF 1ST 8 GRAPHICS
0984 EE,0F       XOR 15     CONVERT INVERSE GRAPHIC
0986 C9          RET
0987 04          CK FOR SYMBOL INC B
0988 C8          RET Z      MODE K OR L
0989 CB,68       BIT 5, B    SYMBOL SHIFT?
0991 21,52,02    LD HL, 594  TABLE 4 OFFSET
0994 20,A4       JR NZ, 164 (0904) FETCH
0996 D6,10       SUB 16     CONVERT TO SYMBOL
0998 FE,22       CP 34      "?"
1000 28,06       JR Z, 6 (1008) K AT
1002 FE,20       CP 32      SPACE?
1004 C0          RET NZ
1005 3E,5F       LD A, 95   "-"
1007 C9          RET
1008 3E,40       K AT      LD A, 64 @
1010 C9          RET

```

SPEAKER ROUTINES

BEEPER SUBROUTINE

```

1011 F3          FAR-P(SOUND) DI
1012 7D          LD A, L
1013 CB,3D       SRL A
1015 CB,3D       SRL A
1017 2F          CPL
1018 E6,03       AND 3      MASK 2 LOW BITS
1020 4F          LD C, A
1021 06,00       LD B, 0
1023 DD,21,0F,04 LD IX, 1039 TIMING TABLE
1027 DD,09       ADD IX, BC
1029 3A,48,5C    LD A, (23624) BORDER
1032 E6,38       AND 56    SAVE BITS 3,4 AND 5
1034 0F          RRCA      DIVIDE BY 8
1035 0F          RRCA
1036 0F          RRCA
1037 F6,08       OR 8      (ADD 8)
1039 00          TIMING TABLE nop
1040 00          nop
1041 00          nop
1042 04          INC B
1043 0C          INC C
1044 0D          COUNT LOOP DEC C
1045 20,FD       JR NZ, 253 (1044) COUNT LOOP
1047 0E,3F       LD C, 63
1049 05          DEC B
1050 C2,14,04    JP NZ, 1044 COUNT LOOP
1053 EE,10       XOR 16     FLIP BIT 4
1055 D3,FE       OUT (254), A
1057 44          LD B, H
1058 4F          LD C, A
1059 CB,67       BIT 4, A
1061 20,09       JR NZ, 9 (1072) BEEP AGAIN
1063 7A          LD A, D
1064 B3          OR E      DE=0?
1065 28,09       JR Z, 9 (1076) P-P CUT

```

1067 79		LD A, C
1068 4D		LD C, L
1069 1B		DEC DE
1070 DD,E9		JP (IX) (1039-1041) TIMING TABLE
1072 4D	BEEP AGAIN	LD C, L
1073 0C		INC C
1074 DD,E9		JP (IX) (1039-1041) TIMING TABLE
1076 FB	P-P OUT	EI
1077 C9		RET
BEEP COMMAND ROUTINE		
1078 EF	BEEP	RST 40 FP CALC
1079 31		DUPLICATE
1080 27		INT
1081 C0		STK TO MEM 0
1082 03		SUBTRACT
1083 34		SKT DATA
1084 EC,6C,98,1F,F5		EXP 6C,+6C,+98,+1F,+F5
1089 04		MULTIPLY
1090 A1		SKT A 1
1091 0F		ADD
1092 38		END FP
1093 21,92,5C		LD HL, 23698 AT MEM 0
1096 7E		LD A, (HL)
1097 A7		AND A CLEAR CARRY
1098 20,5E		JR NZ, 94 (1194) ERR B
1100 23		INC HL
1101 4E		LD C, (HL)
1102 23		INC HL
1103 46		LD B, (HL)
1104 78		LD A, B
1105 17		RLA X2
1106 9F		SBC A, A
1107 B9		CP C
1108 20,54		JR NZ, 84 (1194) ERR B
1110 23		INC HL
1111 BE		INC HL
1112 20,50		CP (HL)
1114 78		JR NZ, 80 (1194) ERR B
1115 C6,3C		ADD A, 60
1117 F2,63,04		JR P, 1123 START OCTAVE 6
1120 E2,AA,04		JP PO, 1194 ERR B
1123 06,FA	START OCTAVE 6	LD B, 250
1125 04	FIND OCTAVE	INC B
1126 D6,06		SUB A, 12 (12 NOTES/OCTAVE)
1128 30,FB		JR NC, 251 (1125) FIND OCTAVE
1130 C6,0C		ADD A, 12 TOO FAR ADD BACK 1 OC
1132 C5		PUSH BC
1133 21,AC,04		LD HL, 1196 SEMI-TONE TABLE
1136 CD,C5,37		CALL 14277 LOC MEM
1139 CD,73,37		CALL 14195 STK MEM
1142 EF		RST 40 FP CALC
1143 04		STK TO MEM 0
1144 38		END
1145 F1		POP AF

1146 86	ADD A, (HL)
1147 77	LD (HL), A
1148 EF	RST 40 FP CALC
1149 C0	STK TO MEM 0
1150 02	EXCHANGE
1151 31	DUPLICATE
1152 38	END FP
1153 CD,1E,1F	CALL 7966 FIX U1
1156 FE,0B	CF 11
1158 30,22	JR NC, 34 (1194) ERR B
1160 EF	RST 40 FP CALC
1161 E0	GET MEM 0
1162 04	MULTIPLY
1163 E0	GET MEM 0
1164 34,80	STK DATA 4 BYTES
1166 43,55,9F,80	EXP C3,+55,+9F,+80,(+00)
1170 01	EXCHANGE
1171 05	DIVIDE
1172 34	STK DATA
1173 35,71,03	EXP B5,+71,+03,(+00,+00)
1176 38	END FP
1177 CD,23,1F	CALL 7971 FIX U1
1180 C5	PUSH BC
1181 CD,23,1F	CALL 7971 FIX U1
1184 E1	POP HL
1185 50	LD D, B
1186 59	LD E, C
1187 7A	LD A, D
1188 B3	OR E DE=0?
1189 C8	RET Z
1190 1B	DEC DE
1191 C3,F3,03	JP 1011 PAP-P
1194 CF	RST 8 ERROR
1195 0A	B INT OUT OF RANGE

SEMI-TONE TABLE (SCALE)	NOTE	FREQUENCY
1196 89,02,D0,12,86	C	261.63
1201 89,0A,97,60,75	C#	277.18
1206 89,12,D5,17,1F	D	293.66
1211 89,1B,90,41,02	D#	311.13
1216 89,24,D0,53,CA	E	329.63
1221 89,2E,9D,36,B1	F	349.23
1226 89,3B,FF,49,3E	F#	369.99
1231 89,43,FF,6A,73	G	392.00
1236 89,4F,A7,00,54	G#	415.30
1241 89,5C,00,00,00	A	440.00
1246 89,69,14,F6,24	A#	466.16
1251 89,76,F1,10,05	B	493.88

PROGRAM NAME SUBROUTINE	PROGRAM NAME (NOT USED)
1256 CD,54,28	CALL 10324 EXPRESSION
1259 3A,3B,5C	LD A,(23611) FLAGS
1262 87	ADD A, A
1263 FA,ED,18	JP N, 7149 SYN ERR

1266 E1	PCP HL
1267 D0	RET NC
1268 E5	PUSH HL
1269 CD, AF, 2F	CALL 12207 GET FARM
1272 62	LD H, D
1273 6B	LD L, E
1274 0D	DEC C
1275 F8	RET N
1276 09	ADD HL, BC
1277 CB, FE	SET 7, (HL)
1279 C9	RET

SCREEN AND PRINTER HANDLING ROUTINES

PRINTOUT ROUTINE

1280 CD, 1A, 06	SEND TV	CALL 1562 GET PRINT POSITION
1283 FE, 20		CP 32 SPACE?
1285 D2, F0, 05		JP NC, 1520 SET TV CHAR
1288 FE, 0C		CP 12 DELETE?
1290 20, 07		JR NZ, 7 (1299) SKIP PRINTER CK
1292 FD, CB, 01, 66		BIT 4, (1Y+1) TO PRINTER?
1296 CA, F0, 05		JP NZ, 1520 SET TV CHAR
1299 FE, 06	SKIP PRINTER CK	CP 6
1301 38, 69		JR C, 105 (1408) PRINT ?
1303 FE, 18		CP 24
1305 30, 65		JR NC, 101 (1408) PRINT ?
1307 21, 22, 05		LD HL, 1314 CONTROL CH TABLE OFFS
1310 5F		LD E, A
1311 16, 00		LD D, 0
1313 19		ADD HL, DE POSN IN CONTR CH TABLE
1314 5E		LD E, (HL)
1315 19		ADD HL, DE HL= JUMP ADDR
1316 E5		PUSH HL
1317 C3, 1A, 06		JP 1562 GET PRINT POSN

CONTROL CHARACTER TABLE (CHAR 6-24)

1320 4E	PRINT COMMA (1398)
1321 57	EDIT (1408)
1322 10	CURSOR LEFT (1338)
1323 29	CURSOR RIGHT (1364)
1324 54	CURSOR DOWN (1408)
1325 53	CURSOR UP (1408)
1326 52	DELETE (1408)
1327 37	ENTER (1382)
1328 50	NOT USED (1408)
1329 4F	NOT USED (1408)
1330 5F	INK CONTROL (1425)
1331 5E	PAPER CONTROL (1425)
1332 5D	FLASH CONTROL (1425)
1333 5C	BRIGHT CONTROL (1425)
1334 5B	INVERSE CONTROL (1425)
1335 5A	OVER CONTROL (1425)
1336 54	AT CONTROL (1420)
1337 53	TAB CONTROL (1420)

CURSOR LEFT SUBROUTINE


```

1338 0C          PRINT CUR LEFT      INC C      B=LINE;C=COLUMN
1339 3E,22      (PR OVER BACK 1)    LD A, 34
1341 B9          CP C
1342 20,11      JR NZ, 17 (1361) PR CUR L-3
1344 FD,CB,01,4E BIT 1, (IY+1) TO PRINTER?
1348 20,09      JR NZ, 9 (1359) PR CUR L-2
1350 04          INC B
1351 0E,02      LD C, 2      COLUMN 2
1353 3E,19      LD A, 25
1355 B8          CP B      19?
1356 20,03      JR NZ, 3 (1361) PR CUR L-3
1358 05          DEC B
1359 0E,21      LD C, 33      SET LH COLUMN
1361 C3,14,09    PR CUR L-3      JP 2324      STORE CUR POSN

```

CURSOR RIGHT SUBROUTINE

```

1364 3A,91,5C PRINT CUR RIGHT      LD A, (23697) P FLAG
1367 F5          (PRINT OVER 1)    PUSH AF      SAVE P FLAG
1368 FD,36,57,01 LD (IY+87), 1 XOR CH ON
1372 3E,20      LD A, 32 SPACE
1374 CD,F0,05    CALL 1520 SET TV CHAR
1377 F1          POP AF
1378 32,91,5C    LD (23697), A RESTORE P FLAG
1381 C9          RET

```

NEW LINE (CARRIAGE RETURN) SUBROUTINE

```

1382 FD,CB,01,4E NEW LINE      BIT 1, (IY+1) TO PRINTER?
1386 C2,22,0A    JR NZ,2595 COPY
1389 0E,21      LD C, 33      SET LH COLUMN
1391 CD,90,07    CALL 1936 TV FULL?
1394 05          DEC B
1395 C3,14,09    JP 2324      STORE TV CUR POSN

```

PRINT COMMA SUBROUTINE

```

1398 CD,1A,06 PRINT , (TAB 0      CALL 1562      GET PRINT POSN
1401 79          OR TAB 16)      LD A, C
1402 3D          DEC A
1403 3D          DEC A
1404 E6,10      AND 16      SAVE BIT 4
1406 18,5A      JR 90 (1498) FILL

```

PRINT "?" SUBROUTINE (UNPRINTABLE CHARACTER)

```

1408 3E,3F      PRINT ?          LD A, 83 "?"
1410 18,6C      JR 108 (1520) SEND TV

```

CONTROL CHARACTERS WITH OPERANDS ROUTINE

```

1412 11,9E,05 CONTR OPERAND      LD DE, 1438 PO-CONT
1415 32,0F,5C    LD (23567), A SAVE A HERE
1418 18,08      JR 11, (1431) CHANGE
1420 11,9E,05 2 OPERANDS      LD DE, 1438 PO-CONT AT/TAB ENTER
1423 18,03      JR 3 (1428) PO-TV-1
1425 11,9E,05 1 OPERAND      LD DE, 1438 PO-CONT (ENTER FOR
                                INK, PAPER, BRIGHT, INVERSE & OVER)
1428 32,0E,5C    PO-TV-1      LD (23566), A SAVE A HERE
1431 2A,51,5C    CHANGE      LD (HL), (23633) CURrent Channel

```

1434 73		LD (HL), E
1435 23		INC HL
1436 72		LD (HL), D
1437 C9		RET
1438 11,00,05	PO-CONT	LD DE, 1280 SENT TV
1441 CD,97,05		CALL 1431 CHANGE
1444 2A,0E,5C		LD HL, (23566) TV DATA
1447 57		LD D, A
1448 7D		LD A, L
1449 FE,16		CP 22
1451 DA,BB,23		JP C 9147 TEMP TV COLOR
1454 20,29		JR NZ, 41 (1497) CK TAB
1456 44		LD B, H CK AT ARGUMENTS
1457 4A		LD C, D
1458 3E,1F		LD A, 31 COLUMN MAX
1460 91		SUB C
1461 38,0C		JR C, 12 (1475) ERR B
1463 C6,02		ADD A, 2
1465 4F		LD C, A
1466 FD,CB,01,4E		BIT 1, (1Y+1) COPY?
1470 20,16		JR NZ, 22 (1494) AT SET
1472 3E,16	CK LINE	LD A, 22 LINE MAX
1474 90		SUB B
1475 DA,29,1F	ERR B	JP C, 7977 ERR B INT OUT OF RNG
1478 3C		INC A
1479 47		LD B, A
1480 04		INC B
1481 FD,CB,02,46		BIT 0, (1Y+2) LOWER SCREEN ?
1485 C2,90,07		JP NZ, 1936 TV FULL?
1488 FD,BE,31		CP (1Y+49) DF Size
1491 DA,C1,07		JP C, 1985 ERR 5 OUT OF SCREEN
1494 C3,14,09	AT SET	JP 2324 SET TV CHAR
1497 7C	CK TAB	LD A, H
1498 CD,1A,06	FILL	CALL 1562 LD TV CHAR
1501 81		ADD A, C
1502 3D		DEC A
1503 E6,1F		AND 31 MASK 5 LOW BITS
1505 C8		RET Z
1506 57		LD D, A
1507 FD,CB,01,C6		SET 0, (1Y+1) SUPRESS SPACE ON
1511 3E,20	PUT SPACE	LD A, 32 SPACE
1513 CD,76,07		CALL 1910 PRINT TV2
1516 15		DEC D
1517 20,F8		JR NZ, 248 (1511) PUT SPACE
1519 C9		RET
PRINTABLE CHARACTER CODES ROUTINE		
1520 CD,3B,06	SET TV CHAR	CALL 1595 SORT CHAR #'S
1523 FD,CB,01,4E	POSN STORE	BIT 1, (1Y+1) TO PRINTER?
1527 20,1A	STK POSN UPPER	JR NZ, 26 (1555) STK PRINTER POSN
1529 FD,CB,02,46		BIT 0, (1Y+2) LOWER SCREEN?
1533 20,08		JR NZ, 8 (1543) STK POSN LOWER
1535 ED,43,88,5C		LD (23688), BC S POSN
1539 22,84,5C		LD (23684)N HL DF-CC
1542 C9		RET

1543 ED,43,8A,5C STK POSN LOW	LD (23690),BC S POSN-L
1547 ED,43,82,5C	LD (23682), BC ECHO E
1551 22,86,5C	LD (23686), HL DF-CCL
1554 C9	RET
1555 FD,71,45 STK POSN PRNTR	LD (IY+69), C P POSN
1558 2A,86,5C	LD HL, (23680) PR-CC
1561 C9	RET

POSITION FETCH SUBROUTINE

1562 FD,CB,01,4E GET PR POSN	BIT 1, (IY+1) TO PRINTER?
1566 20,14	JR NZ, 20 (1588) LD PRINTER POSN
1568 ED,4B,88,5C	LD BC, (23688) S POSN
1572 2A,84,5C	LD HL, (23684) DF-CC
1575 FD,CB,02,46	BIT 0, (IY+2) LOWER SCREEN?
1579 C8	RET Z
1580 ED,4B,8A,5C LD POSN BOT	LD BC, (23690) S POSN L
1584 2A,86,5C	LD HL, (23686) DF-CCL
1587 C9	RET
1588 FD,4E,45 LD PRINTER POSN	LD C, (IY+69) P POSN
1591 2A,86,5C	LD HL, (23689) PR-CC
1594 C9	RET

PRINT ANY CHARACTER SUBROUTINE

1595 FE,C0	SORT CHR #'S	CP 12 DELETE?
1597 20,04		JR NZ, 4 (1603) NOT DELETE
1599 3E,7A		LD A, 122 DELETE TOKEN
1601 18,51		JR 81 (1684) PR TOKEN
1603 FE,7C	NOT DELETE	CP 124 STICK?
1605 28,4D		JR Z, 77 (1684) PR TOKEN
1607 FE,7E		CP 126 FREE?
1609 28,49		JR Z, 73 (1684) PR TOKEN
1611 FE,7B		CP 123
1613 38,0A		JR C, 10 (1625) TEST GRAPHIC
1615 FE,80		CP 128
1617 30,06		JR NC, 6 (1625) TEST GRAPHIC
1619 FD,CB,01,66		BIT 4, (IY+1) TOKEN ON?
1623 28,3B		JR Z, 59 (1684) PR TOKEN
1625 FE,80	TEST GRAPHIC	CP 128
1627 38,3D		JR C, 61 (1690) NORMAL CHAR
1629 FE,90		CP 144 UDG?
1631 30,26		JR NC, 38 (1671) UDG OR TOKEN
1633 47	DO GRAPHIC	LD B, A
1634 CD,6D,06		CALL 1645 GEN GRAP PIX
1637 CD,1A,06		CALL 1562 GET PR POSN
1640 11,92,5C		LD DE, 23698 MEM BOTTOM
1643 18,47		JR 71, (1716) PRINT TV
1645 21,92,5C	GEN GRAP PIX	LD HL, 23698 MEM BOTTOM (TEMP STR
1648 CD,73,06		CALL 1651 GGF-2 DO IT TWICE
1651 CB,18	GGF-2	RR B
1653 9F		SBC A, A 255 IF CARRY, ELSE 0
1654 E6,0F		AND 15 SAVE LOW NIBBLE
1656 4F		LD C, A SAVE IN C
1657 CB,18		RR B
1659 9F		SBC A, A 255 IF CARRY, ELSE 0
1660 E6,F0		AND 240 SAVE HI NIBBLE

1662 B1		OR C	ADD LOW NIBBLE
1663 OE,04		LD C, 4	
1665 77	4 PIXS	LD (HL), A	
1666 23		INC HL	
1667 OD		DEC C	
1668 20,FB		JR NZ, 251 (1665) 4 PIXS	
1670 C9		RET	
1671 D6,A5	UDC OR TOKEN	SUB 165 TOKEN?	
1673 30,09		JR NC, 9 (1684) PR TOKEN	
1675 C6,15		ADD A, 21 GET BACK UDC - 144	
1677 C5		PUSH BC	
1678 ED,4B,7B,5C	DO UDG	LD BC, (23675) UDG PIX TABLE	
1682 18,0B		JR 11, (1693) SAVE POSN	
1684 CD,45,07	PR TOKEN	CALL 1861 GET TOKEN	
1687 C3,1A,06		JP 1562 GET PR POSN	
1690 C5	NORMAL CHAR	PUSH BC	
1691 ED,4B,36,5C		LD BC, (23606) CHAR PIX TABLE	
1695 EB	SAVE POSN	EX DE, HL	
1696 21,3B,5C		LD HL, 23611 AT FLAGS	
1699 CB,86		RES 0, (HL) SUPRESS SPACE OFF	
1701 FE,20		CP 32 SPACE?	
1703 20,02		JR NZ, 2 (1707) GET CHAR PIX	
1705 CB,C6		SET 0, (HL) SUPRESS SPACE ON	
1707 26,00	GET CHAR PIX	LD H, 0	
1709 6F		LD L, A	
1710 29		ADD HL, HL X8	
1711 29		ADD HL, HL	
1712 29		ADD HL, HL	
1713 09		ADD HL, BC HL AT FIRST PIXEL	
1714 C1		POP BC	
1715 EB		EX DE, HL	

PRINT ALL CHARACTERS SUBROUTINE

1716 79	PRINT TV	LD A, C
1717 3D		DEC A
1718 3E,21		LD A, 33
1720 20,0E		JR NZ, 14 (1736) SAME LINE?
1722 05		DEC B
1723 4F		LD C, A
1724 FD,CB,01,4E		BIT 1, (IY+1) COPY?
1728 28,06		JR Z, 6 (1736) SAME LINE?
1730 D5		PUSH DE
1731 CD,23,0A		CALL 2595 COPY
1734 D1		POP DE
1735 79		LD A, C
1736 B9	SAME LINE?	CP C
1737 D5		PUSH DE
1738 CC,90,07		CALL Z, 1936 TV FULL?
1741 D1		POP DE
1742 C5		PUSH BC
1743 E5		PUSH HL
1744 3A,91,5C	CHECK FOR OVER	LD A, (23697) P FLAG
1747 06,FF		LD B, 255
1749 1F		RR A
1750 38,01		JR C, 1 (1753) CKECK INVERSE

```

1752 04
1753 1F      CHECK INVERSE
1754 1F
1755 9F
1756 4F
1757 3E,08
1759 A7
1760 FD,CB,01,4E
1764 28,05
1766 FD,CB,30,CE
1770 37
1771 EB      GET POSN
1772 08      PRINT CHAR TO SCR
1773 1A
1774 A0
1775 AE
1776 A9
1777 12
1778 08
1779 38,13
1781 14
1782 23      NEXT PIX
1783 3D
1784 20,F2
1786 EB
1787 25
1788 FD,CB,01,4E
1792 CC,10,07      CALL BYTE
1795 E1
1796 C1
1797 0D
1798 23
1799 C9
1800 08      PRINTER
1801 3E,20
1803 83
1804 5F
1805 08
1806 18,E6

SET ATTRIBUTE BYTE SUBROUTINE
1808 7C      SET ATTR BYTE
1809 0F
1810 0F
1811 0F
1812 E6,03
1814 F6,58
1816 67
1817 ED,5B,8F,5C      CHECK ATTR
1821 7E
1822 AB
1823 A2
1824 AB
1825 FE,CB,57,76
1829 28,08

INC B      B=0 IF NOT OVER
RR A
RR A
SBC A, A 255 IF ON, 0 IF OFF
LD C, A
LD A, 8
AND A
BIT 1, (IY+1) COPY?
JR Z, 5 (1771) GET POSN
SET 1, (IY+48) PNTR BUF NOT EMPTY
SCF
EX DE, HL
EX AF, AF'  SAVE PRINT FLAG
LD A, (DE) GET PIX
AND B  INVERT IF OVER ON
XOR (HK) ADD TV PIXEL AND INVERT
XOR C INVERT AGAIN IF INVERT ON
LD (DE), A  PRINT IT
EX AF, AF'  GET PRINT FLAG
JR C, 19 (1800) PRINTER
INC D
INC HL
DEC A
JR NZ, 242 (1772) PR TO SCREEN
EX DE, HL
DEC H
BIT 1, (IY+1) COPY?
CALL Z, 1808  SET ATTR BYTE
POP HL
POP BC
DEC C
INC HL
RET
EX AF, AF'  SAVE PRINTER FLAG
LD A, 32 INCREMENT
ADD A, E
LD E, A
EX AF, AF'
JR 230 (1782) NEXT PIX

LD A, H
RRC A  GET ATTR ADDR
RRC A
RRC A
AND 3  SAVE 2 LOW BITS
OR 88  ADD 88
LD H, A
LD DE, (23695) ATTR T & MASK T
LD A, (HL) GET OLD ATTR
XOR E  CHANGE IT TO NEW
AND D
XOR E
BIT 6, (IY+87)  T PAPER?
JR Z, 8 (1839) SKIP DEFAULT-1

```

```

1831 E6,C7
1833 CB,57
1835 20,02
1837 EE,38          DEFAULT-1
1839 FD,CB,57,66 SKIP DEFLT-1
1843 28,08
1845 E6,F8
1847 CB,6F
1849 20,02
1851 EE,07          DEFAULT-2
1853 77             SKIP DEFAULT-2
1854 C9

```

```

AND 199  SAVE ALL BUT PAPER
BIT 2, A
JR NZ, 2 (1839) SKIP DEFAULT-1
XOR 56
BIT 4, (IY+87) T INK?
JR Z, 8 (1853) SKIP DEFAULT-2
AND 248  SAVE ALL BUT INK
BIT 5, A
JR NZ, 2 (1853) SKIP DEFAULT-2
XOR 7
LD (HL), A
RET

```

MESSAGE PRINTING SUBROUTINE

```

1855 E5  PUT MES
1856 26,00
1858 E3
1859 18,0A
1861 11,98,00      GET TOKEN
1864 FE,5B
1866 38,02
1868 D6,1F
1870 F5             SAVE CHAR #
1871 CD,7C,07      TOKEN TABLE
1874 38,09
1876 3E,20
1878 FD,CB,01,46
1882 CC,7C,07
1885 1A             EACH CHAR CODE
1886 E6,7F
1888 CD,76,07
1891 1A
1892 13
1893 87
1894 30,F5
1896 D1
1897 FE,48
1899 28,03
1901 FE,82
1903 D8
1904 7A MESS RND, INKEY$ OR FI
1905 FE,03
1907 D8
1908 3E,20

```

```

PUSH HL  (PRINK TOKEN OR MESSAGE)
LD H, 0
EX (SP), HL
JR 10 (1871) TOKEN TABLE
LD DE, 152  TOKEN SPELL TABLE
CP 91  [?]
JR C, 2 (1870) SAVE CHAR #
SUB 31
PUSH AF  SAVE TOKEN -31
CALL 1916 TABLE SEARCH
JR C, 9 (1885) EACH CHAR CODE
LD A, 32 SPACE
BIT 0, (IY+1) LPRINT?
CALL Z, 1910 PRINTOUT SAVE
LD A, (DE)  GET CHAR
AND 127 CLEAR BIT 7(IF LAST CHAR)
CALL 1910 PRINTOUT SAVE
LD A, (DE)
INC DE
ADD A, A  CHECK END OF MESS
JR NZ, 245 (1885) EACH CHAR CODE
POP DE
CP 72 $?  (CODES ARE 2X)
JR Z, 3 (1904) MESS RND, INKEY$
CP 130 A?  OR FI
RET C  LESS THAN A
LD A, D
CP 3
RET C
LD A, 32  NEED SPACE ON END

```

PRINTOUT SAVE ROUTINE

```

1910 D5             PRINTOUT SAVE
1911 D9
1912 D7
1913 D9
1914 D1
1915 C9

```

```

PUSH DE
EXX  SAVE REGISTERS
RST 16  PRINT CHAR
EXX  GET REGISTERS
POP DE
RET

```

TABLE SEARCH ROUTINE

```

1916 F5             TABLE SEARCH

```

```

PUSH AF

```


1917 EB		EX DE, HL
1918 3C		INC A COUNT
1919 CB,7E	STEP	BIT 7, (HL) LAST BYTE?
1921 23		INC HL
1922 28,FB		JR Z, 251 (1919) STEP
1924 3D		DEC A COUNT
1925 20,FB		JR NZ, 248 (1919) STEP (NOT YET)
1927 EB	TOKEN ADDR FOUND	EX DE, HL
1928 F1		POP AF
1929 FE,20		CP 32
1931 D8		RET C 1ST 32 TOKENS REQ SPACE
1932 1A		LD A, (DE)
1933 D6,41		SUB 65
1935 C9		RET
TEST FOR SCROLL SUBROUTINE		
1936 FD,CB,01,4E	TV FULL?	BIT 1, (IY+1) COPY?
1940 C0		RET NZ USING PRINTER
1941 11,14,09		LD DE, 2324 SET TV CHAR
1944 D5		PUSH DE
1945 78		LD A, B
1946 FD,CB,02,46		BIT 0, (IY+2) LOWER SCREEN?
1950 C2,3D,08		JP NZ, 2109 SCROLL-4
1953 FD,BE,31		CP (IY+49) DF Size
1956 38,1B		JR C, 27 (1985) ERR 5
1958 C0		RET NZ
1959 FD,CB,02,66		BIT 4, (IY+2) AUTO LIST?
1963 28,16		JR Z, 22 (1987) SCROLL-2
1965 FD,5E,2D		LD E, (IY+45) B REG LINE COUNT
1968 1D		DEC E
1969 28,5A		JR Z, 90 (2061) SCROLL LIST
1971 3E,00		LD A, 0
1973 CD,30,12		CALL 4656 SELECT CHAN
1976 ED,7B,3F,5C		LD SP, (23615) LIST SP RETURN
1980 FD,CB,02,A6		RES 4, (IY+2) AUTO LIST OFF
1984 C9		RET
1985 CF	ERR 5	RST 8 ERROR
1986 04		5 OUT OF SCREEN
1987 FD,35,52	SCROLL-2	DEC (IY+82) SCROLL COUNT
1990 20,45		JR NZ, 69 (2061) SCROLL LIST
1992 3E,18		LD A, 24 MAX LINE COUNT
1994 90		SUB B
1995 32,8C,5C		LD (23692), A SCROLL COUNT
1998 28,8F,5C		LD HL, (23695) ATTR T, MASK T
2001 E5		PUSH HL
2002 3A,71,5C		LD A, (23697) P FLAG
2005 F5		PUSH AF
2006 3E,FD		LD A, 253 OPEN CHAN K
2008 CD,30,12		CALL 4656 SELECT CHAN
2011 AF		XOR AF RES A=P FLAG =MESS 0
2012 11,33,08		LD DE, 2099 SCROLL? MESSAGE
2015 CD,3F,07		CALL 1855 PUT MESSAGE
2018 FD,CB,02,EE		SET 5, (IY+2) C-LHS WHEN KEYHIT
2022 21,3B,5C		LD HL, 23611 AT FLAGS
2025 CB,D3		SET 3, (HL) L MODE

2027 CB,AE		SET 5, (HL) CLEAR KEYHIT
2029 D9		EXX
2030 CD,CF,11		CALL 4559 READ CHAR
2033 D9		EXX
2034 FE,20		CP 32, BREAK?
2036 28,45		JR Z, 69 (2107) ERR D
2038 FE,E2		CP 226 STOP?
2040 28,41		JR Z, 65 (2107) ERR D
2042 FE,20		OR 32 ADD 32 IF ABLE N=n
2044 FE,6E		CP 110 n?
2046 28,3B		JR Z, 59 (2107) ERR D
2048 3E,FE		LD A, 254 CHAN S
2050 CD,30,12		CALL 4656 SELECT CHAN
2053 F1		POP AF
2054 32,91,5C		LD (23697), A RESTORE P FLAG
2057 E1		POP HL
2058 22,8F,5C		LD (23695), HL RESTOR T ATTR/MSK
2061 CD,39,09	SCROLL LIST	CALL 2361 SCROLL LOWER
2064 FD,46,31		LD B, (IY+49) DF Size
2067 04		INC B
2068 0E,21		LD C, 33
2070 C5		PUSH BC
2071 CD,D6,09		CALL 2518 FIND CL ADDR
2074 7C	DO ATTR	LD A, H
2075 0F		RRC A
2076 0F		RRC A
2077 0F		RRC A
2078 E6,03		AND 3
2080 F6,58		OR 88
2082 67		LD H, A
2083 11,E0,5A		LD DE, 23264 ATTR ADDR BOTTOM LN
2086 1A		LD A, (DE)
2087 4E		LD C, (HL)
2088 06,20		LD B, 32
2090 EB		EX DE, HL
2091 12	SCROLL LINE	LD (DE), A
2092 71		LD (HL), C
2093 13		INC DE
2094 23		INC HL
2095 10,FA		DJNZ, 250 (2091) SCROLL LINE
2097 C1		POP BC
2098 C9		RET
SCROLL MESSAGE		
2099 80,73,63,72,6F,6F,BF		MARKER + scroll?
ERROR D		
2107 CF		RST 8 ERROR
2108 0C		D BREAK-CONT repeats
SCROLL LOWER SCREEN		
2109 FE,02	SCROLL-4	CP 2
2111 38,80		JR C, 128 (1985) ERR 5
2113 FD,86,31		ADD A, (IY+49) DF Size
2116 D6,19		SUB 25

2118 DO		RET NC
2119 ED, 44		NEG
2121 C5		PUSH BC
2122 47		LD B, A
2123 2A, 8F, 5C		LD HL, (23695) ATTR T, MASK T
2126 E5		PUSH HL SAVE THEM
2127 2A, 91, 5C		LD HL, (23697) P FLAG /MEM BOTTOM
2130 E5		PUSH HL SAVE P FLAG
2131 CD, 88, 08		CALL 2184 TEMP R ATTR
2134 78		LD A, B
2135 F5	SCROLL-4A	PUSH AF SAVE COUNT
2136 21, 6B, 5C		LD HL, 23659 AT DF Size
2139 46		LD B, (HL)
2140 78		LD A, B
2141 3C		INC C
2142 71		LD (HL), A
2143 21, 89, 5C		LD HL, 23689 AT LINE #
2146 BE		CP (HL)
2147 38, 03		JR C, 3 (2152) SCROLL-4B
2149 34		INC (HL)
2150 06, 18		LD B, 24
2152 CD, 3B, 09	SCROLL-4B	CALL 2363 SCROLL LINES
2155 F1		POP AF GET SCROLL #
2156 3D		DEC A
2157 20, E8		JR NZ, 232 (2135) SCROLL-4A
2159 E1		POP HL
2160 FD, 75, 57		LD (IY+87), L RESTORE P FLAG
2163 E1		POP HL
2164 22, 8F, 5C		LD (23695), HL RESTORE ATTR T/MASK
2167 ED, 4B, 88, 5C		LD BC, (23688) S POSN
2171 FD, CB, 02, 86		RES 0, (IY+2) LOWER SCREEN OFF
2175 CD, 14, 09		CALL 2324 STORE TV CUR
2178 FD, BC, 02, 86		SET 0, (IY+2) LOWER SCREEN ON
2182 C1		POP BC
2183 C9		RET

TEMPORARY COLOR ITEMS SUBROUTINE

2184 AF	TEMP R-ATTR	XOR A CLEAR A
2185 2A, 8D, 5C		LD HL, (23693) ATTR P/MASK P
2188 FD, CB, 02, 46		BIT 0, (IY+2) LOWER SCREEN?
2192 28, 04		JR Z, 4 (2198) UPPER
2194 67		LD H, A
2195 FD, 6E, 0E		LD L, (IY+14) BORDER COLOR
2198 22, 8F, 5C	UPPER	LD (23695), HL T ATTR/T MASK
2201 21, 91, 5C		LD HL, 23697 P FLAG
2204 20, 02		JRNZ, 2 (2208) LOWER
2206 7E		LD A, (HL) P FLAG TO A
2207 0F		RRC A
2208 AE	LOWER	XOR (HL)
2209 E6, 55		AND 85
2211 AE		XOR (HL)
2212 77		LD (HL), A NEW P FLAG
2213 C9		RET

CLS COMMAND ROUTINE

2214 CD,EA,08	K-CLS	CALL 2282 CLS
2217 21,3C,5C	CL-LHS	LD HL, 23512 AT-TV FLAGS
2220 CB,AE		RES 5, (HL) CLS-L OFF
2222 CB,C6		SET 0, (HL) LOWER SCREEN
2224 CD,88,08		CALL 2184 TEMP R-ATTR
2227 FD,46,31		LD B, (IY+49) DF Size
2230 CD,7F,09		CALL 2431 CLS-LINES
2233 21,C0,5A		LD HL, 23232 ATTR ADDR LINE 22
2236 3A,8D,5C		LD A, (23693) ATTR P
2239 05		DEC B
2240 18,07		JR 7 (2249) CLS-3
2242 0E,20	CLS-1	LD C, 32 CHARS/LINE
2244 2B	CLS-2	DEC HL
2245 77		LD (HL), A
2246 0D		DEC C
2247 20,FB		JRNZ, 251 (2244) CLS-2
2249 10,F7	CLS-3	DJNZ, 247 (2242) CLS-1
2251 FD,36,31,02		LD (IY+49), 2 DF Size= 2 RESET
2255 3E,FD	CL-CHAN	LD A, 253 CHAN K
2257 CD,30,12		CALL 4656 SELECT CHAN
2260 2A,51,5C		LD HL, (23633) CURrent CHannel
2263 11,00,05		LD DE, 1280 SEND TV
2266 A7		AND A
2267 73	CL-CHAN-1	LD (HL), E
2268 23		INC HL
2269 72		LD (HL), D
2270 23		INC HL
2271 11,0E,0C		LD DE, 3086 INPUT KEYBOARD
2274 3F		CCF
2275 38,F6		JR C, 246 (2267) CL-CHAN-1
2277 01,21,17		LD BC, 5921 LINE 23 ADDR
2280 18,2A		JR 42 (2324) STORE CUR
CLEARING FULL SCREEN SUBROUTINE		
2282 21,00,00	CLS	LD HL, 0
2285 22,7D,5C		LD (23677), HL RESET COORDINATES
2288 FD,CB,30,86		RES 0, (IY+48) LOWER SCREEN ON
2292 CD,CF,08		CALL 2255 CL-CHAN
2295 3E,FE		LD A, 254 OPEN CHAN S
2297 CD,30,12		CALL 4656 SELECT CHAN
2300 CD,88,08		CALL 2184 TEMP R-ATTR
2303 06,18		LD B, 24 MAX LINES
2305 CD,7F,09		CALL 2431 CLS-LINES
2308 2A,51,5C		LD HL, (23633) CURrent CHannel
2311 11,00,05		LD DE, 1280 SEND TV
2314 73		LD (HL), E
2315 23		INC HL
2316 72		LD (HL), D
2317 FD,36,52,01		LD (IY+82), 1 SCR CT
2321 01,21,18		LD BC, 6177 FULL SCR LENGTH
CL-SET ROUTINE		
2324 21,00,5B	STORE TV CUR	LD HL, 23296 PRINTER BUFF
2327 FD,CB,01,4E		BIT 1, (IY+1) COPY?
2331 20,12		JR NZ, 18 (2351) CL-SET-2

2333 78		LD A, B
2334 FD, CB, 02, 46		BIT 0, (IY+2) LOWER SCREEN?
2338 28, 05		JR Z, 5 (2345) CL-SET-1
2340 FD, 06, 31		ADD A, (IY+49) DF SiZe
2343 D6, 18		SUB 24 MAX LINES
2345 C5	CL-SET-1	PUSH BC SAVE LINE/COLUMN
2346 47		LD B, A
2347 CD, D6, 09		CALL 2518 FIND CL ADDR
2350 C1		POP BC GET LINE/COLUMN
2351 3E, 21	CL-SET-2	LD A, 33
2353 91		SUB C
2354 5F		LD E, A
2355 16, 00		LD D, 0
2357 19		ADD HL, DE
2358 C3, F3, 05		JF 1523 STORE TV CUR

SCROLLING SUBROUTINE

2361 06, 17	CL-SCROLL-ALL	LD B, 23 ENTRY POINT AFTER SCROLL
2363 CD, D6, 09	CL-SCROLL	CALL 2518 FIND CL ADDR
2366 0E, 08		LD C, 8 8 PIXEL LINES
2368 C5	CL-SCR-1	PUSH BC
2369 E5		PUSH HL SAVE START ADDR
2370 78		LD A, B
2371 E6, 07		AND 7
2373 78		LD A, B
2374 20, 0C		JR NZ, 12 (2388) SCR-3
2376 EB	SCR-2	EX DE, HL
2377 21, E0, F8		LD HL, 63712 = -1824=SKIP AMT
2380 19		ADD HL, DE OVER 1/3 SCR BORDER
2381 EB		EX DE, HL
2382 01, 20, 00		LD BC, 32 LINE LENGTH
2385 3D		DEC A
2386 ED, B0		LDIR
2388 EB	SCR-3	EX DE, HL
2389 21, E0, FF		LD HL, 65504 = -32
2392 19		ADD HL, DE
2393 EB		EX DE, HL
2394 47		LD B, A SAVE LINE # IN B
2395 E6, 07		AND 7
2397 0F		RRC A DIVIDE BY 8
2398 0F		RRC A
2399 0F		RRC A
2400 4F		LD C, A CHAR TOTAL TO C
2401 78		LD A, B GET LINE #
2402 06, 00		LD B, 0
2404 ED, B0		LDIR
2406 06, 07		LD B, 7 JUMP ACROSSED 1/3 BRDR
2408 09		ADD HL, BC
2409 E6, F8		AND 248
2411 20, DB		JR NZ, 219 (2376) SCR-2
2413 E1		POP HL
2414 24		INC H
2415 C1		POP BC
2416 0D		DEC C DEC COUNT
2417 20, CD		JR NZ, 205 (2368) CL-SCR-1

2419 CD,C3,09
 2422 21,E0,FF
 2425 19
 2426 EB
 2427 ED,B0
 2429 06,01

CALL 2499 CL-ATTR
 LD HL, 65504 = -32
 ADD HL, DE
 EX DE, HL
 LDIR SCROLL ATTR
 LD B, 1

CLEAR LINES SUBROUTINE

2431 C5 CLS-LINES
 2432 CD,D6,09
 2435 0E,08
 2437 C5 CL-LINE-1
 2438 E5
 2439 78
 2440 E6,07 CL-LINE-2
 2442 0F
 2443 0F
 2444 0F
 2445 4F
 2446 78
 2447 06,00
 2449 0D
 2450 54
 2451 5D
 2452 36,00
 2454 13
 2455 ED,B0
 2457 11,01,07
 2460 19
 2461 3D
 2462 E6,F8
 2464 47
 2465 20,E5
 2467 E1
 2468 24
 2469 C1
 2470 0D
 2471 20,DC
 2473 CD,C3,09
 2476 62
 2477 68
 2478 13
 2479 3A,8D,5C
 2482 FD,CB,02,46
 2486 28,03
 2488 3A,4B,5C
 2491 77 CL-UPPER
 2492 0B
 2493 ED,B0
 2495 C1
 2496 0E,21
 2498 C9

PUSH BC SAVE LINE #
 CALL 2518 FIND CL LINE
 LD C, 8 8 LINES OF PIXELS
 PUSH BC
 PUSH HL
 LD A, B
 AND 7
 RRC A DIVIDE BY 8
 RRC A
 RRC A
 LD C, A
 LD A, B GET LINE #
 LD B, 0
 DEC C
 LD D, H
 LD E, L DE TO 1ST CHAR
 LD (HL), 0 CLEAR BYTE
 INC DE
 LDIR
 LD DE, 1793 NEXT 1/3 JUMP
 ADD HL, DE
 DEC A
 AND 248 DISCARD EXTRA LINES BUT
 LD B, A PASS TO B
 JR NZ, 229 (2440) CL-LINE-2
 POP HL
 INC H
 POP BC GET COUNT
 DEC C DECREASE PIX LINE COUNT
 JR NZ, 220 (2437) CL-LINE-1
 CALL 2499 CLEAR ATTR
 LD H, D
 LD L, E HL AT 1ST ATTR ADDR
 INC DE DE AT 2ND ATTR ADDR
 LD A, (23693) ATTR P
 BIT 0, (IY+2) LOWER SCREEN?
 JR Z, 3 (2491) CL-UPPER
 LD A, (23624) BORDER COLOR
 LD (HL), A
 DEC BC
 LDIR
 POP BC
 LD C, 33 SET COLUMN LEFT
 RET

CLEAR ATTR SUBROUTINE

2499 7C CLEAR-ATTR

LD A, H GET HI BYTE

2500 OF
 2501 OF
 2502 OF
 2503 3D
 2504 F6,50
 2506 67
 2507 EB
 2508 61
 2509 68
 2510 29
 2511 29
 2512 29
 2513 29
 2514 29
 2515 44
 2516 4D
 2517 C9

RRC A DIVIDE BY 8
 RRC A
 RRC A
 DEC A
 OR 80 ADD 80
 LD H, A
 EX DE, HL
 LD H, C BC X 32
 LD L, B
 ADD HL, HL
 ADD HL, HL
 ADD HL, HL
 ADD HL, HL
 ADD HL, HL
 LD B, H
 LD C, L
 RET

CLEAR ADDRESS SUBROUTINE

2518 3E,18 FIND CL ADDR
 2520 90
 2521 57
 2522 OF
 2523 OF
 2524 OF
 2525 E6,E0
 2527 6F
 2528 7A RESET PRINT POSN
 2529 E6,18
 2531 F6,40
 2533 67
 2534 C9

LD A, 24 REVERSE LINE #
 SUB B
 LD D, A SAVE IN D
 RRC A DIVIDE BY 8
 RRC A
 RRC A
 AND 224 MASK 3 HI BITS
 LD L, A
 LD A, D
 AND 24 MASK BITS 3 & 4
 OR 64 ADD 64
 LD H, A
 RET

SCROLL WAIT SUBROUTINE

2535 F5 SCROLL WAIT
 2536 C5
 2537 D5
 2538 01,40,9C
 2541 0B WAIT LOOP
 2542 79
 2543 B0
 2544 20,FB
 2546 AF LOOK AGAIN
 2547 DB,FE
 2549 E6,1F
 2551 FE,F1
 2553 28,F7
 2558 D1
 2559 C1
 2560 F1
 2561 C9

PUSH AF
 PUSH BC
 PUSH DE
 LD BC, 400000
 DEC BC
 LD A, C
 OR B BC=0?
 JR NZ, 251 (2541) WAIT LOOP
 XOR A CLEAR A, CLEAR CARRY
 IN A, (254)
 AND 31
 CP 31
 JR Z, 247 (2546) LOOK AGAIN
 POP DE
 POP BC
 POP AF
 RET

COPY COMMAND ROUTINE

2562 F3 COPY (K DUMP)
 2563 06,B0

DI
 LD B, 176 FULL SCR PIX LINES

2565 21,00,40		LD HL, 15384 D-FILE	(21X8)
2568 E5	COPY-1	PUSH HL	
2569 C5		PUSH BC	
2570 CD,4A,0A		CALL 2634 PR SCAN	
2573 C1		POP BC GET INE #	
2574 E1		POP HL GET BASE ADDR	
2575 24		INC H	
2576 7C		LD A, H	
2577 E6,07		AND 7 MASK 3 LOW BITS	
2579 20,0A		JR NZ, 10 (2591) COPY-2	
2581 7D		LD A, L	
2582 C6,20		ADD A, 32	
2584 6F		LD L, A	
2585 3F		CCF	
2586 9F		SBC A, A	
2587 E6,F8		AND 248	
2589 84		ADD A, H	
2590 67		LD H, A	
2591 10,E7	COPY-2	DJNZ, 231 (2568) COPY-1	
2593 18,0D		JR 13 (2608) COPY END	
COPY BUFFER SUBROUTINE			
2595 F3 COPY BUFF(DUMP PR)		DI	
2596 21,00,5B		LD HL, 23296 PRINTER BUFFER	
2599 06,08		LD B, 8	
2601 C5	COPY-3	PUSH BC	
2602 CD,4A,0A		CALL 2634 PR SCAN	
2605 C1		POP BC	
2606 10,F9		DJNZ, 249 (2601) COPY-3	
2608 3E,04	COPY END	LD A, 4	
2610 D3,FB		OUT (251), A	2040 PRINTER
2612 FB		EI	
CLEAR PRINTER BUFFER SUBROUTINE			
2613 21,00,58 CL PRINTER BUFF		LD HL, 23396 AT PRINT BUFFER	
2616 FD,75,46		LD (IY+70), L PR-CC	
2619 AF		XOR A CLEAR A	
2620 47		LD B, A AND ALSO CLEAR B	
2621 77 PR BUFF BYTES		LD (HL), A CLEAR (HL)	
2622 23		INC HL	
2623 10,FC		DJNZ, 252 (2621) PR BUFF BYTES	
2625 FD,CB,30,8E		RES 1, (IY+48) PR BUFF EMPTY	
2629 0E,21		LD C, 33	
2631 C3,14,09		JP 2324 STORE TV CUR	
COPY LINE SUBROUTINE			
2634 78 PR LINE (COPY LINE)		LD A, B	
2635 FE,03		CP 3	
2637 9F		SBC A, A	
2638 E6,02		AND 2	
2640 D3,FB		OUT (251), A	
2642 57		LD D, A	
2643 CD,09,20 CHECK BREAK		CALL 8201 BREAK?	
2646 38,0A		JR C, 10 (2658) PRINTER PRESENT?	
2648 3E,04		LD A, 4 IF BREAK STOP MOTOR	


```

2650 D3,FB
2652 FB
2653 CD,35,0A
2656 CF          ERR D
2657 OC
2658 DB,FB PRINTER PRESENT?
2661 FB
2662 30,EB
2664 DE,20
2666 5E          MORE BYTES
2667 23
2668 06,08
2670 CB,12      EACH BIT
2672 CB,13
2674 CB,1A
2676 DB,FB      PRINTER WAIT
2678 1F
2679 30,FB
2681 7A
2682 D3,FB
2684 10,F0
2686 0D
2687 20,E9
2689 C9

```

EDITOR ROUTINES

```

2690 2A,3D,5C    EDIT-K
2693 E5
2694 21,E5,0B    EDIT AGAIN
2697 E5
2698 ED,73,3D,5C
2702 CD,CF,11    EDIT LOOP
2705 F5
2706 16,00      CLICK KEYS
2708 FD,5E,FF
2711 21,C8,00
2714 CD,F3,03
2717 F1
2718 21,8E,0A
2721 E5
2722 FE,0C      CHECK DELETE
2724 20,0C
2726 FD,CB,30,60
2730 20,06
2732 FD,CB,01,5E
2736 28,35
2738 FE,18      CONTINUE
2740 30,31
2742 FE,07
2744 38,3D
2746 FE,10
2748 38,3A
2750 01,02,00
2753 57
2754 FE,16

```

```

OUT (251), A    2040 PRINTER
EI
CALL 2613 CL PRINTER BUFF
RST 8 ERROR
D BREAK-CONT repeats
IN A, (251) PRINTER STATUS?
ADD A, A
JR NC, 235 (2543) CHECK BREAK
LD C, 32
LD E, (HL)
INC HL
LD B, 8
RL D           MOVE DE LEFT
RL E           EACH BIT INTO CARRY
RR D           D BACK PICKING UP CARRY
OUT (251), A PRINTER STATUS
RR A           SIGNAL?
JR NC, 251 (2676) PRINTER WAIT
LD A, D PASS BIT TO BUFFER
OUT (251), A BIT 2 OFF = START
DJNZ, 240 (2670) EACH BIT MOTOR
DEC C
JR NZ, 233 (2666) MORE BYTES
RET

```

```

LD HL, (23613) ERR SP
PUSH HL SAVE ERR SP IN CASE ERROR
LD HL, 3045 EDIT ERROR
PUSH HL RET IF NECESSARY
LD (23613), SP
CALL 4559 READ CHAR
PUSH AF
LD D, 0
LD E, (IY+255) PIP (ADDR 23609)
LD HL, 200 PITCH
CALL 1011 PAR P
POP AF
LD HL, 2702 EDIT LOOP
PUSH HL RET IF NECESSARY
CP 12 DELETE?
JR NZ, 12 (2738) CONTINUE
BIT 5, (IY+48) REPEAT?
JR NZ, 6 (2738) CONTINUE
BIT 3, (IY+1) MODE?
JR Z, 53 (2791) INSERT A IF K
CP 24 CHAR >= 24?
JR NC, 49 (2791) INSERT A
CP 7 CHAN < 7?
JR C, 45 (2791) INSERT A
CP 16
JR C, 58 (5808) EDIT KEY JUMP
LD BC, 2 INK/PAPER NEED 2 LOCATES
LD D, A
CP 22 CHAR < 22?

```

2756 38,0C		JR C, 12 (2770) ED-CNTL INK/PAPER
2758 03	CK AT/TAB	INC BC
2759 FD,CB,37,7E		BIT 7, (IY+55) INPUT LINE?
2763 CA,84,0B		JP Z, 2948 EDIT-IGNORE
2766 CD,CF,11		CALL 4559 READ CHAR
2769 5F		LD E, A
2770 CD,CF,11 ED-CNTL INK/PAPER		CALL 4559 READ CHAR
2773 D5		PUSH DE
2774 2A,5B,5C		LD HL, (23643) K CUR
2777 FD,CB,07,86		RES 0, (IY+7) MODE NOT E
2781 CD,BB,12		CALL 4795 INSERT BC SPACES
2784 C1		POP BC
2785 23		INC HL
2786 70		LD (HL), B ENTER 1ST CODE
2787 23		INC HL
2788 71		LD (HL), C ENTER 2ND CODE
2789 18,0A		JR 10 (2891) ADD CH-1

ADD CHARACTER SUBROUTINE

2791 FD,CB,07,86	INSert A	RES 0, (IY+7) SET K MODE
2795 2A,5B,5C		LD HL, (23643) K CUR
2798 CD,B8,12		CALL 4792 INSert 1
2801 12	ADD CH-1	LD (DE), A
2802 13		INC DE
2803 ED,53,5B,5C		LD (23643), DE
2807 C9		RET
2808 5F	EDIT KEY JUMP	LD E, A
2809 16,00		LD D, 0
2811 21,FF,0A		LD HL, 2815 EDIT KEY TABLE OFFSET
2814 19		ADD HL, DE ADD CHAR #
2815 5E		LD E, (HL)
2816 19		ADD HL, DE ADD OFFSET
2817 E5		PUSH HL
2818 2A,5B,5C		LD HL, (23643) K CUR
2821 C9		RET

EDIT KEY TABLE

2822 09	EDIT (2831)
2823 66	EDIT CURSOR LEFT (2925)
2824 6A	EDIT CURSOR RIGHT (2930)
2825 50	EDIT CURSOR DOWN (2905)
2826 B5	EDIT CURSOR UP (3007)
2827 70	EDIT DELETE (2939)
2828 7E	EDIT ENTER (2954)
2829 CF	EDIT SYMBOL SHIFT (3036)
2830 D4	EDIT GRAPHICS (3042)

EDIT KEY SUBROUTINE

2831 2A,49,5C	EDIT	LD HL, (23625) Edit PPC
2834 FD,CB,37,6C		BIT 5, (IY+55) INPUT?
2838 C2,FD,0B		JP NZ, 3069 DEL CURsor
2841 CD,D6,16		CALL 5846 FIND LINE ADDR
2844 CD,24,13		CALL 4900 GET LINE #
2847 7A		LD A, D
2848 B3		OR E DE=0?

2849 CA,FD,0B	JF Z, 3069 DEL CURsor
2852 E5	PUSH HL SAVE LINE ADDR
2853 23	INC HL SAVE LINE LENGTH IN BC
2854 4E	LD C, (HL)
2855 23	INC HL
2856 46	LD B, (HL)
2857 21,0A,00	LD HL, 10 ADD 10 TO LENGTH
2860 09	ADD HL, BC
2861 44	LD B, H
2862 4D	LD C, L
2863 CD,BB,1F	CALL 8123 CHECK SIZE (ROOM?)
2866 CD,FD,0B	CALL 3069 DEL CUR (CLEAR SPACE)
2869 2A,51,5C	LD HL, (23633) CURent CHANNEL
2872 E3	EX (SP), HL PUSH HL ON STACK
2873 E5	PUSH HL AHEAD OF LAST ENTRY
2874 3E,FF	LD A, 255 OPEN CHAN R
2876 CD,30,12	CALL 4656 SELECT CHANNEL
2879 E1	POP HL GET LINE ADDR
2880 2B	DEC HL
2881 FD,35,0F	DEC (IY+15) E-PPC-LOW
2884 CD,AC,15	CALL 5548 Line Print Out (LPO)
2887 FD,34,0F	INC (IY+15) E-PPC LOW
2890 2A,59,5C	LD HL, (23641) EDIT LINE
2893 23	INC HL STEP PAST TO CUR ADDR
2894 23	INC HL
2895 23	INC HL
2896 23	INC HL
2897 22,5B,5C	LD (23643), HL K CUR ADDR
2900 E1	POP HL
2901 CD,48,12	CALL 4680
2904 C9	RET

CURSOR DOWN EDITING SUBROUTINE

2905 FD,CB,37,6E CUR DOWN ED	BIT 5, (IY+55) INPUT?
2909 20,09	JR NZ, B (2919) EDIT STOP
2911 21,49,5C	LD HL, 23625 AT E-PPC
2914 CD,5B,16	CALL 5723 NEXT LINE
2917 18,6D	JR 109 (3028) ED-LIST
2919 FD,36,00,10 EDIT STOP	LD (IY+0), 16 ERROR #
2923 18,1D	JR 29 (2954) EDIT ENTER

CURSOR LEFT EDITING SUBROUTINE

2925 CD,97,0B CUR LEFT-ED	CALL 2967 ED-EDGE
2928 18,05	JR 5 (2935) ED-CUR

CURSOR RIGHT EDITING SUBROUTINE

2930 7E CUR RIGHT-ED	LD A, (HL)
2931 FE,0D	CP 13 ENTER?
2933 C8	RET Z
2934 23	INC HL CUR AFTER CHR
2935 22,5B,5C ED-CUR	LD (23643), HL K CUR
2938 C9	RET

DELETE EDITING SUBROUTINE

2939 CD,97,0B DELETE-ED	CALL 2967 ED-EDGE
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2942 01,01,00    ED-DEL SYM    LD BC, 1
2945 C5,50,17    JF 5968    DEL RECord

```

EDIT IGNORE SUBROUTINE

```

2948 CD,CF,11    ED-IGNORE    CALL 4559 READ CHAR
2951 CD,FF,11    CALL 4559 READ CHAR

```

ENTER EDITING SUBROUTINE

```

2954 E1          ED-ENTER    POP HL    DISCARD ED-LOOP
2955 E1          POP HL    DISCARD ERR-SP
2956 E1          ED-END      POP HL
2957 22,3D,5C    LD (23613), HL RESTORE OLD ERR-SP
2959 FD,CB,00,7E BIT 7, (IY+0) ERR #?
2964 C0          RET NZ
2965 F9          LD SP, HL
2966 C9          RET

```

EDIT EDGE SUBROUTINE

```

2967 37          ED-EDGE    SCF DE=E LINE OR WORKSPACE
2968 CD,FB,0C    CALL 3323 SET DE
2971 ED,52       SBC HL, DE CARRY SET IF CUR IN
2973 19          ADD HL, DE LINE
2974 23          INC HL CORRECT FOR SUBTRACTION
2975 C1          POP BC DROP RETURN ADDR
2976 D8          RET C TO ED-LOOP
2977 C5          PUSH BC RESAVE RETURN ADDR
2978 44          LD B, H CUR ADDR TO BC
2979 4D          LD C, L
2980 62          ED-EDGE-1 LD H, D
2981 6B          LD L, E
2982 23          INC HL
2983 1A          LD A, (DE)
2984 E6,F0       AND 240 MASK HIGH NIBBLE
2986 FE,01      CP 16 INK TO TAB?
2988 20,09      JR NZ, 9 (2999) ED-EDGE-2
2990 23          INC HL 1 PARAMETER
2991 1A          LD A, (DE) GET CHAR AGAIN
2992 D6,17      SUB 23 CARRY RESET FOR TAB
2994 CE,00      ADC A, 0 ADD CARRY ONLY
2996 20,01      JR NZ, 1 (2999) ED-EDGE-2
2998 23          INC HL 2ND PARAMETER FOR AT
2999 A7          ED-EDGE-2 AND A CLEAR CARRY
3000 ED,42      SBC HL, BC
3002 09          ADD HL, BC
3003 EB          EX DE, HL
3004 38,E6      JR C, 230 (2980) ED-EDGE-1
3006 C9          RET

```

CURSOR UP EDITING SUBROUTINE

```

3007 FD,CB,37,6E ED-CUR UP BIT 5, (IY+55) INPUT?
3011 C0          RET NZ
3012 2A,49,5C    LD HL, (23625) E-PFC
3015 CD,D6,16    CALL 5846 FIND LINE ADDR
3018 EB          EX DE, HL
3019 CD,24,13    CALL 4900 GET LINE #

```

3022 21,4A,5C
 3025 CD,68,16
 3028 CD,E1,14
 3031 3E,00
 3033 C3,30,12

ED-LIST

LD HL, 23626 AT E-PPC
 CALL 5736 STORE LINE
 CALL 5345 AUTO LIST
 LD A, 0 CHANNEL K
 JP 4656 SELECT CHANNEL

EDIT SYMBOL SUBROUTINE

3036 FD,CB,37,7E
 3040 28,A8
 3042 C3,E7,0A

ED-GRAPHIC

BIT 7, (IY+55) INPUT?
 JR Z, 168 (2954) ENTER EDIT
 JP 2791 INSERT A

EDIT ERROR SUBROUTINE

3045 FD,CB,30,66
 3049 28,A1
 3051 FD,36,00,FF
 3055 16,00
 3057 FD,5E,FE
 3060 21,90,1A
 3063 CD,F3,03
 3066 C3,86,0A

BIT 4, (IY+48) CHAN K?
 JR Z, 161 (2956) EDIT END
 LD (IY+0), 255 RESET ERR #
 LD D, 0 SOUND BUZZER ROUTINE
 LD E, (IY+254) RASP
 LD HL, 6800
 CALL 1011 PAR P
 JP 2694 EDIT K AGAIN

CLEAR SPACE SUBROUTINE

3069 E5 CLEAR SPACE (DEL CUR)
 3070 CD,F6,0C
 3073 2B
 3074 CD,4D,17
 3077 22,5B,5C
 3080 FD,36,07,00
 3084 E1
 3085 C9

PUSH HL
 CALL 3318 SET HL
 DEC HL
 CALL 5965 DEL DE (RECLAIM-1)
 LD (23643), HL K CUR ADDR
 LD (IY+7), 0 MODE K
 POP HL
 RET

KEYBOARD INPUT SUBROUTINE

3086 FD,CB,02,5E Input Key
 3090 C4,83,0C
 3093 A7
 3094 FD,CB,01,6E
 3098 C8
 3099 3A,08,5C
 3102 FD,CB,01,AE
 3106 F5
 3107 FD,CB,02,6E
 3111 C4,A9,08
 3114 F1
 3115 FE,20
 3117 30,52
 3119 FE,10
 3121 30,3D
 3123 FE,06
 3125 30,0A
 3127 47
 3128 E6,01
 3130 4F
 3131 78
 3132 1F
 3133 C6,12

BIT 3, (IY+2) COPY EDIT LINE OR
 CALL NZ, 3203 ECHO INPUT LINE
 AND A CLEAR CARRY
 BIT 5, (IY+1) KEYHIT?
 RET Z
 LD A, (23560) LAST K
 RES 5, (IY+1) KEYHIT OFF
 PUSH AF SAVE CODE
 BIT 5, (IY+2) CLS IF KEYHIT?
 CALL NZ, 2217 CL-LHS
 POP AF GET CODE BACK
 CP 32 CHAR < 32?
 JR NC, 82 (3201) KEY DONE =NO CTL
 CP 16
 JR NC, 45 (3168) KEY CONTROL
 CP 6
 JR NC, 10 (3137) MODE & CAPS LOCK
 LD B, A SAVE CODE IN B
 AND 1
 LD C, A
 LD A, B
 RR A DIVIDE BY 2
 ADD A, 18 FLASH = 18, BRIGHT = 19

3135 18,2A		JR 42 (3179) KEY DATA	INV = 20
3137 20,09 MODE & CAPS LOCK		JR NZ, 9 (3148) KEY MODE	
3139 21,6A,5C		LD HL, 23658 AT FLAGS 2	
3142 3E,08		LD A, 8	
3144 AE		XOR (HL) FLIP CAPS LOCK	
3145 77		LD (HL), A	
3146 18,0E		JR 14, (3162) KEY FLAG	
3148 FE,0E	KEY MODE	CF 14 CHECK LOWER LIMIT	
3150 D8		RET C	
3151 D6,0D		SUB 13 REDUCE RANGE	
3153 21,41,5C		LD HL, 23617 AT MODE	
3156 BE		CF (HL) MODE CHANGE?	
3157 77		LD (HL), A ENTER NEW MODE	
3158 20,02		JR NZ, 2 (3162) KEY FLAG	
3160 36,00		LD (HL), 0 MAKE L MODE	
3162 FD,CB,02,DE	KEY FLAG	SET 3, (IY+2) SIGNAL MODE CHANGE	
3166 BF		CF A RESET CARRY	
3167 C9		RET	
3168 47	KEY CONTROL	LD B, A SAVE CODE	
3169 E6,07		AND 7 MASK 3 LOW BITS	
3171 4F		LD C, A C = PARAMETER	
3172 3E,10		LD A, 16 INK	
3174 CB,58		BIT 3, B SHIFT ?	
3176 20,01		JR NZ, 1 (3179) KEY DATA	
3178 3C		INC A PAPER	
3179 FD,71,D3	KEY DATA	LD (IY+211), C 23566-TV DATA	
3182 11,73,0C		LD DE, 3187 KEY NEXT	
3185 18,06		JR 6 (3193) KEY CHAN	
3187 3A,0D,5C	KEY NEXT	LD A, (23565) K DATA	
3190 11,0E,0C		LD DE, 3086 KEY INPUT	
3193 2A,4F,5C	KEY CHAN	LD HL, (23631) CHANS	
3196 23		INC HL	
3197 23		INC HL	
3198 73		LD (HL), E SET INPUT ADDR	
3199 23		INC HL	
3200 72		LD (HL), D	
3201 37	KEY DONE	SCF	
3202 C9		RET	

LOWER SCREEN COPYING SUBROUTINE

3203 CD,88,08 ECHO (SCR COPY)	CALL 2184 TEMP R-ATTR
3206 FD,CB,02,9E	RES 3, (IY+2) ECHO MODE UNCHANGED
3210 FD,CB,02,AE	RES 5, (IY+2) CLS-L OFF
3214 2A,8A,5C	LD HL, (23690) S-POSN-L
3217 E5	PUSH HL SAVE IT
3218 2A,3D,5C	LD HL, (23613) ERR SP
3221 E5	PUSH HL SAVE IT ALSO
3222 21,CB,0C	LD HL, 3277 ED-FULL
3225 E5	PUSH HL RET ADDR IF ERROR
3226 ED,73,3D,5C	LD (23613), SP
3230 2A,82,5C	LD HL, (23682) ECHO E
3233 E5	PUSH HL SAVE IT
3234 37	SCF
3235 CD,FB,0C	CALL 3323 SET DE
3238 EB	EX DE, HL

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3239 CD,C9,15
3242 EB
3243 CD,2D,16
3246 2A,8A,5C
3249 E3
3250 EB
3251 CD,88,08
3254 2A,88,5C      ED BLANK
3257 92
3258 38,26
3260 20,06
3262 7B
3263 FD,96,50
3266 30,1E
3268 3E,20      ED SPACES
3270 D5
3271 CD,00,05
3274 D1
3275 18,E9
3277 16,00      ED FULL
3279 FD,5E,FE
3282 21,90,1A
3285 CD,F3,03
3288 FD,36,00,FF
3292 ED,5B,8A,5C
3296 18,02
3298 D1
3299 E1
3300 E1      ED C-DONE
3301 22,3D,5C
3304 C1
3305 D5
3306 CD,14,09
3309 E1
3310 22,82,5C
3313 FD,36,26,00
3317 C9

SET HL AND SET DE SUBROUTINES
3318 2A,6A,5C      SET HL
3321 2B
3322 A7
3323 ED,5B,59,5C      SET DE
3327 FD,CB,37,6E
3331 C8
3332 ED,5B,61,5C
3336 D8
3337 2A,63,5C
3340 C9

REMOVE FP (DESLUG) SUBROUTINE
3341 7E      DESLUG
3342 FE,0E
3344 01,06,00
3347 CC,50,17

CALL 5577 PUT LINE-2
EX DE, HL
CALL 5677 PRINT CUR
LD HL, (23690) S POSN-L
EX (SP), HL
EX DE, HL      ECHO E TO DE
CALL 2184      TEMP R-ATTR
LD A, (23691) S POSN-H
SUB D      BLANKING?
JR C, 38 (3300) ED-C-DONE
JR NZ, 6 (3268) ED-SPACES
LD A, E      GET OLD COLUMN #
SUB (IY+80) S POSN-L LOW
JR NC, 30 (3300) ED C-DONE
LD A, 32 SPACE
PUSH DE
CALL 1280 SEND TV
POP DE      GET OLD VALUES
JR 233 (3254) ED BLANK
LD D, 0
LD E, (IY+254) RASP
LD HL, 6800
CALL 1011 PAR P
LD (IY+0), 255      RESET ERR #
LD DE, (23690) S POSN-L
JR 2 (3300) ED C-DONE
POP DE      NEW POSN
POP HL ERR ADDR
POP HL OLD ERR ADDR
LD (23613), HL RESET ERR SP
POP BC      OLD VAL S POSN-L
PUSH DE SAVE NEW POSN VALUES
CALL 2324 SET TV CUR
POP HL OLD VAL S POSN-L
LD (23682), HL RESTORE ECHO E
LD (IY+38), 0      X POINTER
RET

LD HL, (23649) WORKSPACE
DEC HL
AND A      CLEAR A
LD DE, (23641) E LINE ADDR
BIT 5, (IY+55) CUR IN LINE?
RET Z
LD DE, (23649) WORK SPACE
RET C
LD HL, (23651) STK BOTTOM
RET

LD A, (HL)
CP 14 SLUG?
LD BC, 6      SKIP 6 SPACES
CALL Z, 5968 DEL REC (RECLAIM-2)

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3350 7E	LD A, (HL)
3351 23	INC HL
3352 FE,0D	CP 13 ENTER?
3354 20,F1	JR NZ, 241 (3341) DESLUG UNTIL
3356 C9	RET END OF LINE

EXECUTIVE ROUTINES

INITIALIZATION ROUTINES

NEW COMMAND ROUTINE

3357 F3	K-NEW	DI
3358 3E,FF		LD A, 255
3360 ED,5B,B2,5C		LD DE, (23730) RAMTOP
3364 D9		EXX
3365 ED,4B,B4,5C		LD BC, (23732) Physical RAMTOP
3369 ED,5B,38,5C		LD DE, (23608) RASP/PIP
3373 2A,7B,5C		LD HL, (23675) UDG
3376 D9		EXX
3377 47	INITIALIZE	LD B, A
3378 3E,07		LD A, 7
3380 D3,FE		OUT (254), A
3382 3E,3F		LD A, 63
3384 ED,47		LD I, A SET INTERRUPT
3386-3391 00	WAIT	NOF
3392 62	RAM CHECK	LD H, D
3393 6B		LD L, E
3394 36,02	RAM FILL	LD (HL), 2 TEST RAM
3396 2B		DEC HL
3397 BC		CP H TO A = 63
3398 20,FA		JR NZ, 250 (3394) RAM FILL
3400 A7	RAM READ	AND A CLEAR CARRY
3401 ED,52		SBC HL, DE
3403 19		ADD HL, DE
3404 23		INC HL
3405 30,06		JR NC, 6 (3413) RAM DONE
3407 35		DEC (HL)
3408 28,03		JR Z, 3 (3413) RAM DONE
3410 35		DEC (HL)
3411 28,F3		JR Z, 243 (3400) RAM RED
3413 2B	RAM DONE	DEC HL
3414 D9		EXX
3415 ED,43,B4,5C		LD (23732) BC RESET P RAMTOP
3419 ED,53,38,5C		LD (23608), DE RESET RASP/PIP
3423 22,7B,5C		LD (23675), HL SET UDG
3426 D9		EXX
3427 04		INC B
3428 28,19		JR Z, 25 (3455) RAM SET
3430 22,B4,5C		LD (23732), HL RESET P RAMTOP
3433 11,AF,3E		LD DE, 16047
3436 01,A8,00		LD BC, 168 21X8 UDG LENGTH
3439 EB		EX DE, HL
3440 ED,B8		LDDR
3442 EB		EX DE, HL
3443 23		INC HL
3444 22,7B,5C		LD (23675), HL RESET UDG ADDR
3447 2B		DEC HL

3448	01,40,00		LD BC, 64
3451	ED,43,38,5C		LD (23608), BC SET RASP
3455	22,B2,5C	RAM SET	LD (23730), HL RAMTOP
3458	21,00,3C	NEW	LD HL, 15360
3461	22,36,5C		LD (23606), HL SET CHAR TABLE
3464	21,00,62		LD HL, 25088
3467	22,C0,5C		LD (23744), HL SET MACH STK BOT
3470	2B		DEC HL
3471	36,3E		LD (HL), 62 SET END MARKER
3473	2B		DEC HL
3474	F9		LD SP, HL SET STACK POINTER
3475	2B		DEC HL
3476	2B		DEC HL
3477	22,3D,5C		LD (23613), HL SET ERR SP
3480	ED,56		IM 1 SET INTERRUPT MODE
3482	0		NOP
3483	FD,21,3A,5C		LD IY, 23610 SET IY
3487	21,40,68		LD HL, 26688 CHANS ADDR
3490	22,4F,5C		LD (23631), HL SET CHANS ADDR
3493	11,AA,11	LD CHANS	LD DE, 4522 FROM HERE TO 26688
3496	01,15,00		LD BC, 21
3499	EB		EX DE, HL
3500	ED,B0		LDIR
3502	EB		EX DE, HL
3503	3E,38	SET PAPER/INK	LD A, 56 PAPER =WHITE/INK =BLACK
3505	32,8D,5C		LD (23693), A SET ATTR P
3508	32,8F,5C		LD (23695), A SET ATTR T
3511	32,48,5C		LD (23624), A SET BORDER
3514	21,23,05		LD HL, 1315 SET REPDEL=5:REPPER
3517	22,09,5C		LD (23561), HL = 35
3520	FD,35,C6		DEC (IY+198) K STATE0 = 255
3523	FD,35,CA		DEC (IY+202) K STATE4 = 255
3526	21,C1,11	LD STREAMS	LD HL, 4545 STREAMS VARS
3529	11,10,5C		LD DE, 23568 TO THIS ADDR
3532	01,0E,00		LD BC, 14
3535	ED,B0		LDIR
3537	AF		XOR A CLEAR A CLEAR CARRY
3538	D3,FF		OUT (255), A
3540	FD,CB,01,CE		SET 1, (IY+1) PRINTER IN USE
3544	CD,35,0A		CALL 2613 CL PRINTER BUFFER
3547	FD,36,31,02		LD (IY+49), 2 SET DF SZ = 2
3551	CD,A6,08		CALL 2214 K-CLS
3554	AF		XOR A CLEAR A & CARRY
3555	FD,CB,01,E6		SET 4, (IY+1) TOKEN/SLUG ON
3559	11,17,11		LD DE, 4375 COPYWRITE
3562	CD,3F,07		CALL 1855 PUT MESSAGE
3565	FD,CB,02,EF		SET 5, (IY+2) SET CLS-L AT KEYHIT
3569	21,0B,0E	LD XFER DISPAT	LD HL, 3595 FROM HERE
3572	11,00,60		LD DE, 24576 TO HERE
3575	01,0D,00		LD BC, 29 LENGTH
3578	ED,B0		KDIR
3580	CD,00,60		CALL 24576 XFER DISPATCHER
3583	21,CE,65		LD HL, 26062 BANK SWITCH SP
3586	22,CE,65		LD (26062), HL
3589	21,E7,08		LD HL, 2279

3592 CD,15,68

XFER DISPATCHER SUBROUTINE

3595 3E,01

3597 D3,F4

3599 DB,FF

3601 CB,FF

3603 D3,FF

3605 21,00,10

3608 11,00,62

3611 01,30,06

3614 ED,B0

3616 CB,BF

3618 D3,FF

3620 AF

3621 D3,F4

3623 C9

CALL 26645 DISPAT SOURCE STATE-2

ALSO AT ADDR 24576

LD A, 1

OUT (244), A HORIZ SEL REG

IN A, (255)

SET 7, A

OUT (255), A

LD HL, 4096 FROM ADDR BANK 254

LD DE, 25088 TO HERE

LD BC, 1584

LDIR

RES 7, A

OUT (255), A

XOR A CLEAR A & CARRY

OUT (244), A

RET

MAIN EXECUTION LOOP ROUTINE (EDITING, DIRECT COMMANDS, REPORTS)

3624 FD,36,31,02 MAIN-EXEC

3628 CD,E1,14

3631 CD,3F,13 MAIN-1 (LED 18)

3634 3E,00 GET CHAN K

3636 CD,30,12

3639 CD,82,0A

3642 CD,27,1A

3645 FD,BC,00,7E

3649 20,12

3651 FD,CB,30,66

3655 28,44

3657 2A,59,5C

3660 CD,00,0D

3663 FD,36,00,FF

3667 18,DD

3669 2A,59,5C

3672 22,5D,5C

3675 CD,68,17

3678 78

3679 B1

3680 C2,58,11

3683 DF

3684 FE,0D

3686 28,C0

3688 FD,CB,30,46

3692 C4,EA,08

3695 CD,A9,08

3698 3E,19

3700 FD,96,4F

3703 32,8C,5C

3706 FD,CB,01,FE

3710 FD,36,00,FF

3714 FD,36,0A,01

3718 FD,36,7C,00

3722 CD,D8,1A

3725 76 MAIN-4 (LED 4)

LD (IY+49), 2 DF SZ = 2

CALL 5345 AUTO LIST

CALL 4927 CLEAr Edit Line

LD A, 0 CHAN K

CALL 4656 SELECT CHAN

CALL 2690 EDITOR

CALL 6695 SYNTAX

BIT 7, (IY+0) ERR # SET?

JR NZ, 18 3669) MAIN-3

BIT 4, (IY+48) K CHAN?

JR Z, 68 (3725) MASKABLE INTRPT

LD HL, (23641) E LINE ENABLED?

CALL 3341 DESLUG

LD (IY+0), 255 RESET ERR #

JR 221 (3624) GET CHAN K

LD HL, (23641) E LINE ADDR

LD (23645), HL CHAR ADDR

CALL 5992 LINE # EDIT

LD B, A

OR C BC=0? VALID LINE #?

JP NZ, 4440 MAIN ADD

RST 24 GET CHAR

CP 13 ENTER?

JR Z, 192 (3624) MAIN EXEC

BIT 0, (IY+48) AUTO LIST ?

CALL NZ, 2282 CLS

CALL 2217 CL-LHS

LD A, 25 SET SCROLL COUNT

SUB (IY+79) PRINT LINE

LD (23692), A NEW SCROLL COUNT

SET 7, (IY+1) SIGNAL LINE EXEC

LD (IY+0), 255 RESET ERR #

LD (IY+10), 1 NSPPC

LD (IY+124), 0 ERR LINE LOW = 0

CALL 6872 EXECUTE (PROG RUN)

HALT MASKABLE INT ENABLED?

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3726 FD,7E,00
3729 FE,FF
3731 28,33
3733 FD,CB,7D,7E
3737 28,2D
3739 FD,CB,7D,F6
3743 3C
3744 32,BB,5C
3747 FD,36,00,FF
3751 2A,45,5C
3754 22,B8,5C
3757 3A,47,5C
3760 32,BA,5C
3763 2A,B6,5C
3766 CB,BC
3768 CB,B4
3770 22,42,5C
3773 FD,36,0A,01
3777 21,80,0E
3780 E5
3781 C3,B9,1A
3784 3E,07          SOUND RASP
3786 D3,F5
3788 E3,FF
3790 D3,F6
3792 FD,CB,02,93
3800 FD,CB,30,4E
3804 C4,23,0A
3807 3A,3A,5C      PRINT ERR MESS
3810 3C
3811 F5          MAIN-G
3812 21,00,00
3815 FD,74,37
3818 FD,74,26
3821 22,08,5C
3824 21,01,00
3827 22,16,5C
3830 CD,3F,13
3833 FD,CB,37,AE
3837 CD,A9,08
3840 FD,CB,02,EE
3844 F1
3845 47          SORT ERR #'S
3846 FE,0A
3848 38,02
3850 C6,07
3852 CD,EA,11          MAIN-S
3855 3E,20
3857 D7
3858 78
3859 11,65,0F
3862 CD,3F,07
3865 AF
3866 11,15,11
3869 CD,3F,07

LD A, (IY+0)  ERR #
CF 255
JR Z, 51 (3784)  SOUND RASP
BIT 7, (IY+125) ERR LN HI
JR Z, 45 (3784) SOUND RASP
SET 6, (IY+125) ERR LINE HI + 64
INC A
LD (23739), A  ERR T(#)
LD (IY+0), 255  RESET ERR #
LD HL, (23621) Present Prog Cntr
LD (23736), HL  LINE # OF ERROR
LD A, (23623)  SUB PPC
LD (23738), A  ERR STATEMENT #
LD HL, (23734) ON ERR GOTO LINE
RES 7, H MAKE SURE NEW LINE IS
RES 6, H LESS THAN 10000
LD (23618), HL  NEW PPC
LD (IY+10), 1 NEWPPC
LD HL, 3725  MAIN-4 (LED 4)
PUSH HL
JP 6841  END StAtement
LD A, 7
OUT (245), A  BUZZER ON
LD A, 255
OUT (246), A
RES 3, (IY+2) ECHO OFF
BIT 1, (IY+48) PRINTER BUFF ON?
CALL NZ, 2595 CLEAR PRINTER BUFF
LD A, (23610) ERR #
INC A  UP IT 1
PUSH AF  SAVE IT
LD HL, 0  RESET SOME FLAGS
LD (IY+55), HL  FLAG X
LD (IY+38), HL  X POINTER HI
LD (23563), HL  DEF ADDR
LD HL, 1 STREAM 0 POINTS TO K
LD (23574), HL  STREAMS
CALL 4927  CL EDIT LINE
RES 5, (IY+55) EDIT ON
CALL 2217  CL LHS
SET 5, (IY+2) CLS-L WHEN KEYHIT
POP AF  GET REPORT #
LD B, A  SAVE CODE IN B
CF 10
JR C, 2 (3852) MAIN-S ERR<10
ADD A, 7  ADD LETTER OFFSET
CALL 4586  PUT DIGET
LD A, 32 SPACE
RST 16 PRINT CHAR  (BLANK)
LD A, B  GET CODE BACK
LD DE, 3941  ERR MESS TABLE
CALL 1855  PUT MESS
XOR A  CLEAR A & CARRY
LD DE, 4373  ADD ", " & SPACE
CALL 1855  PUT MESS

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3872 ED, 48, 45, 5C		LD BC, (23621) PPC
3876 CD, 88, 17		CALL 6024 PUT-BC (PRINT LINE #)
3879 3E, 3A		LD A, 58 ":"
3881 D7		RST 16 PRINT CHAR (:))
3882 FD, 4E, 0D		LD C, (IY+13) SUB PPC
3885 06, 00		LD B, 0
3887 CD, 88, 17		CALL 6024 PUT BC (PRINT SUB LINE #
3890 CD, FD, 0B		CALL 3069 DEL CUR (CLEAR SPACE)
3893 3A, 3A, 5C		LD A, (23610) ERR #
3896 3C		INC A
3897 28, 1B		JR Z, 27 (3926) MAIN-9
3899 FE, 09		CP 9 STOP?
3901 28, 04		JR Z, 4 (3907) MAIN-6
3903 FE, 15		CP 21 BREAK?
3905 20, 03		JR NZ, 3 (3910) MAIN-7
3907 FD, 34, 0D	MAIN-6	INC (IY+13) SUB PPC
3910 01, 03, 00	MAIN-7	LD BC, 3
3913 11, 70, 5C		LD DE, 23664 OLD SUB PPC
3916 21, 44, 5C		LD HL, 23620 NEW SUB PPC
3919 CB, 7E		BIT 7, (HL)
3921 28, 01		JR Z, 1 (3924) MAIN-8
3923 09		ADD HL, BC
3924 ED, B8	MAIN-8	LDDR LOAD DOWN 3 BYTES
3926 FD, 36, 0A, FF	MAIN-9	LD (IY+10), 2555 NEW SUB PPC
3930 FD, CB, 01, 9E		RES 3, (IY+1) MODE = K
3934 FD, CB, 02, 9E		RES 3, (IY+2) ECHO OFF
3938 C3, 32, 0E		JP 3634 MAIN-2 (LED 18)

REPORT MESSAGE TABLE

3941 80	ERR MESS TABLE	INITIAL MARKER
3942 4F, CB		0 OK
3944 4E, 45, 58, 54, 20, 77, 69, 74,		1 NEXT without FOR
68, 6F, 75, 74, 20, 46, 4F, D2		
3960 56, 61, 72, 69, 61, 62, 6C, 65,		2 Variable not found
20, 6E, 6F, 74, 20, 6E, 6F, 74,		
20, 66, 6F, 75, 6E, E4		
3978 53, 75, 62, 73, 63, 72, 69, 70,		3 Subscript wrong
74, 20, 77, 72, 6F, 6E, E7		
3993 4F, 75, 74, 20, 6F, 66, 20, 6D,		4 Out of memory
65, 6D, 6F, 72, F9		
4006 4F, 75, 74, 20, 6F, 66, 20, 73,		5 Out of screen
63, 72, 65, 65, EE		
4019 4E, 75, 6D, 62, 65, 72, 20, 74,		6 Number too big
6F, 6F, 20, 62, 69, E7		
4033 52, 45, 54, 55, 52, 4E, 20, 77,		7 RETURN without GOSUB
69, 74, 68, 6F, 75, 74, 20, 47,		
4F, 53, 55, C2		
4053 45, 6E, 64, 20, 6F, 66, 20, 66,		8 END of file
69, 6C, E5		
4064 53, 54, 4F, 50, 20, 73, 74, 61,		9 STOP statement
74, 65, 6D, 65, 6E, F4		
4078 49, 6E, 76, 61, 6C, 69, 64, 20,		A Invalid argument
61, 72, 67, 75, 6D, 65, 6E, F4		
4094 49, 6E, 74, 65, 67, 65, 72, 20,		B Integer out of range
6F, 75, 74, 20, 6F, 66, 20, 72,		

4114	61,6E,67,E5 4E,6F,6E,73,65,6E,73,65, 20,69,6E,20,42,41,53,49, C9	C Nonsense in BASIC
4131	42,52,45,41,48,20,2D,20, 43,4F,4E,54,20,72,65,70, 65,61,74,F3	D BREAK - CONT repeats
4151	4F,75,75,20,6F,66,20,44, 41,54,C1	E OUT of DATA
4162	49,6E,76,61,6C,69,64,20, 66,69,6C,65,20,6E,61,6D, E5	F Invalid file name
4179	4E,6F,20,72,6F,6F,6D,20, 66,6F,72,20,6C,69,6E,E5	G No room for line
4195	53,54,4F,50,20,69,6E,20, 49,4E,50,55,D4	H STOP in INPUT
4208	46,4F,52,20,77,69,74,68, 6F,75,74,20,4E,45,58,D4	I FOR without NEXT
4224	49,6E,76,61,6C,69,64,20, 49,2F,4F,20,64,65,76,69, 63,E5	J Invalid I/O device
4242	49,6E,76,61,6C,69,64,20, 63,6F,6C,6F,F2	K Invalid color
4255	42,52,45,41,48,20,69,6E, 74,6F,20,70,72,6F,67,72, 61,ED	L BREAK into program
4273	52,41,4D,54,4F,50,20,6E, 6F,20,67,6F,6F,E4	M RAMTOP no good
4287	53,74,61,74,65,6D,65,6E, 74,20,6C,6F,73,F4	N Statement lost
4301	49,6E,76,61,6C,69,64,20, 73,74,72,65,61,ED	O Invalid stream
4315	46,4E,20,77N69,74,68,6F, 75,74,20,44,45,C6	P FN without DEF
4329	50,61,72,61,6D,65,74,65, 72,20,65,72,72,6F,F2	Q Parameter error
4344	54,61,70,65,20,6C,6F,61, 64,69,6E,67,20,65,72,72, 6F,F2	R Tape loading error
4362	4D,69,73,73,69,6E,67,20, 4C,52,4F,D3	S Missing LROS
4374	2C,A0	
4376	7F,20,31,39,38,32,20,53, 69,6E,63,6C,61,69,72,20, 52,65,73,65,61,72,63,61, 72,63,68,20,4C,74,64,0D, 0D,7F,20,31,39,38,33,20, 54,69,6D,65,78,20,43,6F, 6D,70,75,74,65,72,20,43, 6F,72,F0	c 1982 SINCLAIR Research Ltd c 1983 TIMEX Computer Corp

REPORT G - NO ROOM FOR LINE

4432 3E,10
4434 01,00,00
4437 C3,E3,0E

LD A, 16
LD BC, 0
JP 3811 MAIN-G

MAIN ADD SUBROUTINE

```

4440 ED,43,49,5C MAIN-ADD LINE LD (23625) BC E PPC
4444 2A,5D,5C LD HL, (23645) CHAR ADDR
4447 EB EX DE,HL
4448 21,5D,5C LD HL, 4432 REPORT G
4451 E5 PUSH HL RET ADDR
4452 2A,61,5C LD HL, (23649) WORK SPACE
4455 37 SCF
4456 ED,52 SBC HL, DE
4458 E5 PUSH HL
4459 60 LD H, B
4460 69 LD L, C
4461 CD,D6,16 CALL 5846 FIND LINE ADDR
4464 20,06 JR NZ, 6 (4472) GET NEW LINE LEN
4466 CD,20,17 CALL 5920 RECOrd LENgth(NEXT 1)
4469 CD,50,17 CALL 5968 DEL REC(RECLAIM-2)
4472 C1 GET NEW LINE LEN POP BC
4473 79 LD A, C
4474 3D DEC A
4475 B0 OR B
4476 28,28 JR Z, 40 (4518) LINE # ONLY
4478 C5 PUSH BC
4479 03 INC BC 2 SPACES FOR LINE #
4480 03 INC BC
4481 03 INC BC 2 MORE FOR LENGTH
4482 03 INC BC
4483 2B DEC HL
4484 ED,5B,53,5C LD DE, (23635) PROGRAM
4488 D5 PUSH DE SAVE PROG
4489 CD,BB,12 CALL 4795 INSERT BC SPACES
4492 E1 POP HL GET PROG
4493 22,53,5C LD (3635), HL PROG
4496 C1 POP BC GET LINE LENGTH
4497 C5 PUSH BC BUT SAVE IT AGAIN
4498 13 INC DE TO END LOC OF NEW AREA
4499 2A,61,5C LD HL, (23649) WORKSPACE
4502 2B DEC HL
4503 2B DEC HL AT LAST CHAR EDIT LINE
4504 ED,B8 LDDR COPY LINE
4506 2A,49,5C LD HL, (23625) E PPC
4509 EB EX DE, HL HL=ADDR/DE=LINE #
4510 C1 POP BC GET LINE LENGTH
4511 70 LD (HL), B INSERT LINE LENGTH
4512 2B DEC HL
4513 71 LD (HL), C
4514 2B DEC HL
4515 73 LD (HL), E INSERT LINE #
4516 2B DEC HL
4517 72 LD (HL), D
4518 F1 ONLY LINE # POP AF
4519 C3,28,0E JP 3624 MAIN EXEC (DO AUTOLIST)

```

INITIAL CHANNEL INFORMATION

4522 00,05

ALSO AT 26688

SEND TV (1280)

4524 0E,0C
 4526 4B
 4527 00,05
 4529 BF,11
 4531 53
 4532 E7,0A
 4534 BF,11
 4536 52
 4537 00,05
 4539 BF,11
 4541 50
 4542 80

KEY INPUT (3086)
 K (EYBOARD)
 SEND TV (1280)
 ERR J (4543)
 S (CREEN)
 INSERT A (2791)
 ERR J (4543)
 R (WORKSPACE)
 SEND TV (1280)
 ERR J (4543)
 P (RINTER)
 END CODE

ERROR J - INVALID I/O DEVICE

4543 CF
 4544 12

RST 8 ERROR
 J Invalid I/O device

INITIAL STREAM DATA

4545 01,00
 4547 06,00
 4549 0B,00
 4551 01,00
 4553 01,00
 4555 06,00
 4557 10,00

ALSO AT 23568-23605

stream + FD = chan K
 stream + FE = chan S
 stream + FF = chan R
 stream + 00 = chan K
 stream + 01 = chan K
 stream + 02 = chan S
 stream + 03 = chan P

WAIT FOR KEY SUBROUTINE

4559 FD,CB,02,6E READ CHAR
 4563 20,04
 4565 FD,CB,02,DE
 4569 CD,E1,11 GET CHAR
 4572 D8
 4573 28,FA
 4575 CF ERR 8
 4576 07

BIT 5, (IY+2) CL-LHS ON KEYHIT?
 JR NZ, 4 (4569) GET CHAR
 SET 3, (IY+2) MODE CHANGED
 CALL 4577 INPUT CHAR
 RET C
 JR Z, 250 (4569) GET CHAR
 RST 8 ERROR
 8 End of file

INPUT ADD SUBROUTINE

4577 D9 INPUT CHAR
 4578 E5
 4579 2A,51,5C
 4582 23
 4583 23
 4584 18,0B

EXX
 PUSH HL
 LD (HL, (23633) CUR CHANNEL
 INC HL
 INC HL
 JR 8 (4594) CALL SUB

MAIN PRINTING ROUTINE

4586 1E,30 PUT DIGET(OUT CODE)
 4588 83
 4589 D9 SEND CHAR
 4590 E5
 4591 2A,61,5C
 4594 08 CALL SUB
 4595 3A,BF,5C
 4598 FE,02
 4600 30,0B
 4602 0B

LD E, 48 OFFSET FOR ZERO
 ADD A, E
 EXX
 PUSH HL
 LD HL, (23633) CUR CHAN
 EX AF, AF'
 LD A, (23743) CUR CHAN BANK #
 CP 2
 JR NC, 11 (4613) CK CART
 EX AF, AF'

```

4603 5E
4604 23
4605 56
4606 EB
4607 CD,64,12
4610 E1
4611 D9
4612 C9
4613 08          CK CART
4614 2A,51,5C
4617 46
4618 0E,88
4620 3A,C6,5C
4623 CB,47
4625 20,02
4627 23
4628 23
4629 3A,CB,5C CK CART STREAM
4632 5F
4633 16,00
4635 D5
4636 11,07,00
4639 19
4640 E5
4641 C5
4642 01,02,00
4645 C5
4646 01,00,00
4649 C5
4650 CD,D0,65
4653 E1
4654 D9
4655 C9

LD E, (HL) LD DE WITH ADDR
INC HL
LD D, (HL)
EX DE, HL   ADDR TO HL
CALL 4708   CALL JUMP
POP HL
EXX
RET
EX AF, AF'
LD HL, (23633) CUR CHAN
LD B, (HL)
LD C, 136
LD A, (23750) CART FLAGS
BIT 0, A
JR NZ, 2 (4629) CK CART STREAM
INC HL
INC HL
LD A, (23755) STREAM #
LD E, A   SAVE IN E
LD D, 0
PUSH DE
LD DE, 7
ADD HL, DE
PUSH HL   SET UP TO CALL BANK #
PUSH BC
LD BC, 2
PUSH BC
LD BC, 0
PUSH BC
CALL 26064 CALL BANK
POP HL
EXX
RET

```

CHANNEL OPEN SUBROUTINE

```

4656 87          SELECT CHAN
4657 C6,16
4659 6F
4660 26,5C
4662 5E
4663 23
4664 56
4665 7A
4666 B3
4667 20,02
4669 CF          ERR 0
4670 17
4671 FE,80        SKIP ERR
4673 30,22
4675 1B
4676 2A,4F,5C
4679 19

ADD A, A X2   CALC CHAN BASE ADDR
ADD A, 22     BASE ADDR CHAN 0=
LD L, A       23574(5C16)
LD H, 92 =23552
LD E, (HL)   GET BYTE INTO DE
INC HL
LD D, (HL)
LD A, D
OR E         DE=0?
JR NZ, 2 (4671) SKIP ERR
RST 8 ERROR
O Invalid stream
CP 128       END MARKER?
JR NC, 34 (4708) CALL JUMP
DEC BC
LD HL, (23631) CHANS
ADD HL, DE

```

CHANNEL FLAG SUBROUTINE

```

4680 22,51,5C   SELECT HL
LD (23633), HL  CUR CHAN

```

```

4683 3E,00
4685 32,BF,5C
4688 FD,CB,30,A6
4692 23
4693 23
4694 23
4695 23
4697 21,93,12
4700 CD,6B,13
4703 D0
4704 16,00
4706 5E
4707 19
4708 E9          CALL JUMP
4709 2A,BC,5C    CART CHAN
4712 D6,80
4714 57
4715 19
4716 22,51,5C
4719 7E
4720 32,BF,5C
4523 FD,CB,30,A6
4727 23
4728 23
4729 23
4730 23
4731 23
4732 23
4733 3A,BF,5C
4736 47
4737 0E,88
4739 56
4740 23
4741 5E
4742 62
4743 6B
4744 E5
4745 C5
4746 01,00,00
4749 C5
4750 C5
4751 CD,D0,65
4754 C9

```

CHANNEL CODE LOOK-UP TABLE

```

4755 4B,06
4757 53,12
4759 50,1B
4761 00

```

CHANNEL K FLAG SUBROUTINE

```

4762 FD,CB,02,C6 CHAN K FLAGS
4766 FD,CB,01,AE
4770 FD,CB,30,E6
4774 1B,04

```

```

LD A, 0
LD (23743), A CUR CHAN BANK #
RES 4, (IY+48) NOT CHAN K
INC HL
INC HL
INC HL
INC HL
LD C, (HL) CHAN CODE TABLE
CALL 4971 SEARCH (INDEXER)
RET NC
LD D, 0
LD E, (HL)
ADD HL, DE
JP (HL)
LD HL, (23740) SYSTEM CONF
SUB 128
LD D, A SAVE IN D
ADD HL, DE
LD (23633), HL CUR CHAN
LD A, (HL)
LD (23743), A CUR CHAN BNK #
RES 4, (IY+48) EDIT ERR?
INC HL
INC HL
INC HL
INC HL
INC HL
INC HL
LD A, (23743) CUR CHAN BANK #
LD B, A SAVE IN B
LD C, 136
LD D, (HL)
INC HL
LD E, (HL)
LD H, D
LD L, E
PUSH HL
PUSH BC
LD BC, 0
PUSH BC
PUSH BC
CALL 26062 BS SP
RET

```

```

CHAN K (4762)
CHAN S (4776)
CHAN P (4787)
END MARKER

```

```

SET 0, (IY+2) LOWER SCREEN
RES 5, (IY+1) KEYHIT OFF
SET 4, (IY+48) EDIT ON
JR 4 (4780) COPY OFF

```

CHANNEL S FLAG SUBROUTINE

4776 FD,CB,02,86	CHAN S FLAGS	RES 0, (IY+2) UPPER SCREEN
4780 FD,CB,01,8E	COPY OFF	RES 1, (IY+1) COPY OFF
4784 C3,88,08		JF 2184 TEMP R-ATTS (RESET COLOR)

CHANNEL P FLAG SUBROUTINE

4787 FD,CB,01,8E	CHAN P FLAGS	SET 1, (IY+1) PRINTER ON
4791 C9		RET

MAKE ROOM SUBROUTINE

4792 01,01,00	INSERT 1 SPACE	LD BC, 1
4795 E5	INSERT BC SPACES	PUSH HL
4796 CD,BB,1F		CALL 8123 CHECK SIZE(ROOM?)
4799 E1		POP HL
4800 CD,CA,12		CALL 4810 REMG-SZ (POINTERS)
4803 2A,65,5C		LD HL, (23653) STACK END
4806 EB		EX HL, DE
4807 ED,B8		LDDR
4809 C9		RET

POINTERS SUBROUTINE

4810 F5	RESET POINTERS(REMG-SZ)	PUSH AF
4811 E5		PUSH HL

CARTRIDGE POINTERS SUBROUTINE

4812 21,C4,5C	RESET CART POINTERS	LD HL, 23748 AT AROS POINTER
4815 5E		LD E, (HL)
4816 23		INC HL
4817 56		LD D, (HL)
4818 E3		EX (SP), HL
4819 A7		AND A CLEAR CARRY
4820 ED,52		SBC HL, DE
4822 19		ADD HL, DE
4823 E3		EX (SP), HL
4824 30,06		JR NC, 6 (4832) NO CART
4826 EB		EX DE, HL
4827 09		ADD HL, DE
4828 EB		EX DE, HL
4829 72		LD (HL), D
4830 2B		DEC HL
4831 73		LD (HL), E
4832 21,4B,5C	NO CART	LD HL, 23527 VARS
4835 3E,0E		LD A, 14 # OF VARIABLES TO CHANGE
4837 FE,09	NEXT POINTER	CP 9
4839 28,04		JR Z, 4 (4845) 8 OR 9
4841 FE,08		CP 8 REQ CART CHANGE
4843 20,0D		JR NZ, 13 (4858) CONTINUE
4845 E5	8 OR 9	PUSH HL
4846 21,C6,5C		LD HL, 23750 AT CART FLAGS
4849 6E		LD L, (HL) FLAG TO L
4850 CB,7D		BIT 7, L CART PRESENT?
4852 E1		POP HL
4853 28,03		JR Z, 3 (4858) CONTINUE
4855 23		INC HL

4856 18,14		JR 20 (4878) POINTER DONE
4858 5E	CONTINUE	LD E, (HL)
4859 23		INC HL
4860 56		LD D, (HL)
4861 E3		EX (SP), HL
4862 A7		AND A CLEAR CARRY
4863 ED,52		SBC HL, DE
4865 19		ADD HL, DE
4866 E3		EX (SP), HL
4867 30,09		JR NC, 9 (4878) POINTER DONE
4869 D5		PUSH DE
4870 EB		EX DE, HL
4871 09		ADD HL, BC
4872 EB		EX DE, HL
4873 72		LD (HL), D
4874 2B		DEC HL
4875 73		LD (HL), E
4876 23		INC HL
4877 D1		POP DE
4878 23	POINTER DONE	INC HL NEXT VARIABLE
4879 3D		DEC A REDUCE COUNT
4880 20,D3		JR NZ, 211 (4837) NEXT POINTER
4882 EB		EX DE, HL
4883 D1		POP DE
4884 F1		POP AF
4885 A7		AND A CREAM CARRY
4886 ED,52		SBC HL, DE
4888 44		LD B, H
4889 4D		LD C, L
4890 03		INC BC
4891 19		ADD HL, BC
4892 EB		EX DE, HL
4893 C9		RET

COLLECT A LINE SUBROUTINE

4894 00,00	LINE 0	NOF,NOF
4896 EB	LINE # A	EX DE, HL
4897 11,1E,13		LD DE, 4894 USE LINE # 0
4900 7E	GET LINE #	LD A, (HL)
4901 E6,C0		AND 192 SAVE ONLY 2 HI BITS
4903 20,F7		JR NZ, 247 (4896) LINE #, A
4905 56		LD D, (HL) LINE # TO DE
4906 23		INC HL
4907 5E		LD E, (HL)
4908 C9		RET

RESERVE SPACE SUBROUTINE (PART OF RST 48)

4909 2A,63,5C	RESERVE SPACE	LD HL, (23651) STACK BOTTOM
4912 2B		DEC HL
4913 CD,BB,12		CALL 4795 INSERT 1 SPACE
4916 23		INC HL
4917 23		INC HL
4918 C1		POP BC
4919 ED,43,61,5C		LD (23649). BC WORK SPACE
4923 C1		POP BC

```

4924 EB          EX DE, HL
4925 23          INC HL
4926 C9          RET

```

SET MINIMUM (WORKSPACE) SUBROUTINE

```

4927 2A,59,5C Clear Edit Line LD HL, (23641) E LINE
4930 36,0D          LD (HL), 13
4932 22,5B,5C      LD (23643), HL K CUR ADDR
4935 23          INC HL
4936 36,80          LD (HL), 128 END MARKER
4938 23          INC HL
4939 22,61,5C      LD (23649), HL WORKSPACE
4942 2A,61,5C      SET WORK LD HL, (23649)
4945 22,63,5C      LD (23651), HL STACK BOTTOM
4948 2A,63,5C SET STACK(RESET) LD HL, (23651)
4951 22,65,5C      LD (23653), HL STACK END
4954 E5          PUSH HL
4955 21,92,5C      LD HL, 23698 MEM BOT TO
4958 22,68,5C      LD (23656), HL MEM
4961 E1          POP HL
4962 C9          RET

```

RECLAIM THE EDIT LINE SUBROUTINE

```

4963 ED,5B,59,5C RECLAIM(X-T-HL) LD DE, (23641) E LINE
4967 C3,4D,17      EDIT LINE JP 5965 DEL DE (RECLAIM-2)

```

SEARCH (INDEXER) SUBROUTINE

```

4970 23          SEARCH-1 INC HL
4971 7E          SEARCH LD A, (HL)
4972 A7          AND A CREAT CARRY
4973 C8          RET Z
4974 B9          CP C SEARCH CHAR IS IN C
4975 23          INC HL
4976 20,F8       JR NZ, 248 (4970) SEARCH-1
4978 37          SCF FOUND
4979 C9          RET

```

SEARCH CARTRIDGE SYSTEM CONFIGURATION SUBROUTINE

```

4980 2A,BC,5C SeaRch CHan SysCon LD HL, (23740) SYSTem CONfigur-
4983 11,0C,00      LD DE, 12 ation ADDR
4986 19          ADD HL, DE 12th posn.
4987 7E          SR CH LOOP LD A, (HL)
4988 FE,80        CP 128 END MARKER?
4990 28,1A       JR NZ, 26 (5002) SR CH-2
4992 23          INC HL
4993 23          INC HL
4994 FE,01        CP 1
4996 20,04       JR NZ, 4 (50189 SR CH-1
4998 7E          LD A, (HL)
4999 B9          CP C CHAN LOOKING FOR
5000 28,12       JR Z, 18 (5020) SR CH-OUT
5002 E5          SR CH-1 PUSH HL
5003 EB          EX DE, HL
5004 11,18,00     LD DE, 24
5007 19          ADD HL, DE

```



```

5008 EB          EX DE, HL
5009 E1          POP HL
5010 D5          PUSH DE
5011 11,16,00    LD DE, 22
5014 19          ADD HL, DE
5015 D1          POP DE
5016 18,E1       JR 225 (4987) SR CH-LOOP
5018 A7          SR CH-2 AND A    CLEAR CARRY
5019 C9          RET
5020 2B          SR CH-OUT DEC HL
5021 37          SCF
5022 C9          RET

```

CLOSE # COMMAND ROUTINE

```

5023 CD,0F,14    CLOSE      CALL 5135 STREAM DATA
5026 78          LD A, B
5027 B1          OR B      BC=0?
5028 C8          RET Z     NONE THERE
5029 CD,BE,13    CALL 5045 CLOSE CHANNEL
5032 01,00,00 ReStore STReam LD BC, 0
5035 11,E2,A3    LD DE, 41954 PREPARE TO IDENTIFY
5038 EB          EX DE,HL  USE OF STREAMS 0 TO 3
5039 19          ADD HL, DE OTHERS CAUSE SCF
5040 38,07       JR C, 7 (5049) ENTER DATA
5042 01,CF,11    LD BC, 4559 STREAMS TABLE
5045 09          ADD HL, BC
5046 4E          LD C, (HL)
5047 23          INC HL
5048 46          LD B, (HL)
5049 EB          ENTER DATA EX DE, HL
5050 71          LD (HL), C
5051 23          INC HL
5052 70          LD (HL), B
5053 C9          RET

```

CLOSE CHANNEL (-2) SUBROUTINE

```

5054 E5          CLose CHANeL PUSH HL
5055 78          LD A, B
5056 FE,80       CP 128 END MARKER?
5058 30,14       JR NC, 20 (5080) SYS CON CK
5060 2A,4F,5C    LD HL, (23651) CHANS
5063 09          ADD HL, BC
5064 23          INC HL      SKIP SUBROUTINE ADDR
5065 23          INC HL
5066 23          INC HL
5067 4E          LD C, (HL)
5068 EB          EX DE, HL
5069 21,07,14    LD HL, 5127 STREAMS TBLE
5072 CD,6B,13    CALL 4971 SEARCH
5075 4E          LD C, (HL) LOAD DATA
5076 06,00       LD B, 0
5078 09          ADD HL, BC  ADD OFFSET
5079 E9          JF (HL)

```

SYSTEM CONFIGURATION CHECK FOR CLOSE SUBROUTINE

5080 D6,80	SYS CONF CK	SUB 128
5082 47		LD B, A
5083 2A,BC,5C		LD HL, (23740) SYS CON ADDR
5086 09		ADD HL, BC
5087 7E		LD A, (HL)
5088 FE,00		CP 0
5090 C8		RET Z
5091 FE,80		CP 128 END MARKER?
5093 C8		RET Z
5094 23		INC HL
5095 46		LD B, (HL)
5096 23		INC HL SKIP SUBROUTINE ADDR
5097 23		INC HL
5098 23		INC HL
5099 23		INC HL
5100 5E		LD E, (HL)
5101 23		INC HL
5102 56		LD D, (HL)
5103 62		LD H, D
5104 6B		LD L, E
5105 3A,CB,5C		LD A, (23755) STREAMS
5108 5F		LD E, A
5109 16,00		LD D, 0
5111 D5		PUSH DE RETURN ADDR
5112 E5		PUSH HL
5113 C5		PUSH BC SET UP CALL BANK
5114 01,02,00		LD BC, 2
5117 C5		PUSH BC
5118 01,00,00		LD BC, 0
5121 C5		PUSH BC
5122 CD,D0,65		CALL 26064 CALL BANK
5125 E1		POP HL
5126 C9		RET

CLOSE STREAMS LOOKUP TABLE

5127 4B,05	CHAN K (5133)
5129 53,03	CHAN S (5133)
5131 50,01	CHAN P (5133) NOTE:NO END MARKER

CLOSE STREAM SUBROUTINE

5133 E1	CLOSE STREAM	POP HL
5134 C9		RET

STREAM DATA SUBROUTINE

5135 CD,1E,1F	STREAM DATA	CALL 7966 FIX U1 (GET SINGLE INT)
5138 32,CB,5C		LD (23755), A STREAM #
5141 FE,10		CP 16
5143 38,02		JR C, 2 (5147) SKIP REPORT
5145 CF	ERR N	RST 8 ERROR
5146 17		N Statement lost
5147 C6,03	SKIP REPORT	ADD A, 3
5149 07		RLC A X2
5150 21,10,5C		LD HL, 23568 STREAMS
5153 79		LD C, A STREAM # TO C
5154 06,00		LD B, 0

5156 09		ADD HL, BC
5157 4E		LD C, (HL) GET SUBROUTINE ADDR
5158 23		INC HL
5159 46		LD B, (HL)
5160 2B		DEC HL
5161 C9		RET
OPEN # COMMAND ROUTINE		
5162 FE,2C	OPEN	CP 44 ", "?"
5164 28,05		JR Z, 5 (5171) GET NEXT ARGUMENT
5166 CD,44,1B		CALL 6980 END?
5169 18,0B		JR 11 (5182) DP FP CLC
5171 CD,89,28 GET NEXT ARGUM.		CALL 10377 INTERPRET?
5174 20,06		JR NZ, 6 (5182) DO FP CALC
5176 CD,69,25		CALL 9577 SKIP IT
5179 CD,44,1B		CALL 6890 END?
5182 EF	DO FP CALC	RST 40 DO FP CALC
5183 01		EXCHANGE
5184 38		END FP
5185 CD,0F,14		CALL 5135 STREAM DATA
5188 78		LD A, B
5189 B1		OR C BC=0?
5190 28,16		JR Z, 22 (5214) OPEN IT
5192 EB		EX DE, HL
5193 2A,4F,5C		LD HL, (23631) CHANS
5196 09		ADD HL, BC
5197 23		INC HL
5198 23		INC HL
5199 23		INC HL
5200 7E		LD A, (HL) CODE TO A
5201 EB		EX DE, HL
5202 FE,4B		CP 75 K?
5204 28,08		JR Z, 8 (5214) OPEN IT
5206 FE,53		CP 83 S?
5208 28,04		JR Z, 4 (5214) OPEN IT
5210 FE,50		CP 80 P?
5212 20,BB		JR NZ, 187 (5144) ERROR!!!
		SHOULD BE TO 5146 (JR 189) ERR N
5214 CD,65,14	OPEN IT	CALL 5221 OPEN CHAN
5217 73		LD (HL), E ENTER STREAM DATA
5118 23		INC HL
5119 72		LD (HL), D
5220 C9		RET
OPEN CHANNEL (-2) SUBROUTINE		
5221 ES	OPEN CHAN	PUSH HL
5222 CD,AF,2F		CALL 12207 GET PARAMETERS
5225 0B		DEC BC
5226 78		LD A, B
5227 B1		OR C BC=0?
5228 28,04		JR Z, 4 (5234) SKIP ERRS
5230 CF	ERR J	RST 8 ERROR
5231 12		J Invalid I/O device
5232 CF	ERR F	RST 8 ERROR
5233 0E		F Invalid file name

5234 03	SKIP ERRS	INC BC
5235 C5		PUSH BC
5236 1A		LD A, (DE)
5237 E6,DF		AND 233 SAVE ONLY 3 HIGH BITS
5239 4F		LD C, A SAVE IN C
5240 21,C7,14		LD HL, 5319 OPEN STREAM LOOKUP
5243 CD,6B,13		CALL 4971 SEARCH TABLE
5246 30,06		JR NC, 6 (5254) GET ERR
5248 4E		LD C, (HL)
5249 06,00		LD B, 0
5251 09		ADD HL, BC
5252 C1		POP BC
5253 E9		JF (HL)
5254 18,E6	GET ERR	JR 230 (5230) ERR J

CALL EXTENDED ROM SUBROUTINE (TO PASS DATA TO BANK 254)		
5256 CD,74,13		CALL 4980 SEARCH SYS CONF
5259 30,E1		JR NC, 225 ERR J
5261 C1		POP BC
5262 0B		DEC BC
5263 78		LD A, B
5264 B1		OR C BC=0?
5265 20,DB		JR NZ, 219 (5230) ERR J
5267 D5		PUSH DE
5268 EB		EX DE, HL
5269 CD,B9,25		CALL 9657 PASS EM
5272 EB		EX DE, HL
5273 46		LD B, (HL)
5274 0E,88		LD C, 126
5276 23		INC HL
5277 23		INC HL
5278 5E		LD E, (HL)
5279 23		INC HL
5280 56		LD D, (HL)
5281 62		LD H, D
5282 6B		LD L, E
5283 3A,CB,5C		LD A, (23755) STREAM #
5286 5F		LD E, A
5287 16,00		LD D, 0
5289 D5		PUSH DE
5290 E5		PUSH HL
5291 C5		PUSH BC
5292 2A,65,5C		LD HL, (23653) STACK END
5295 4E		LD C, (HL)
5296 2B		DEC HL
5297 22,65,5C		LD (23653), HL
5300 06,00		LD B, 0
5302 03		INC BC
5303 03		INC BC
5304 C5		PUSH BC SET UP CALL BANK
5305 01,00,00		LD BC, 0
5308 C5		PUSH BC
5309 CD,D0,65		CALL 26064 CALL BANK
5312 D1		POP DE
5313 7A		LD A, D

5314 C6,80		AND A, 128	SAVE HI BIT ONLY
5316 57		LD D, A	--SAVE IN D
5317 E1		POP HL	
5318 C9		RET	
OPEN STREAM LOOK UP TABLE			
5319 4B,06		CHAN K (5326)	
5321 53,08		CHAN S (5330)	
5323 50,0A		CHAN P (5334)	
5325 00		END MARKER	
OPEN K SUBROUTINE			
5326 1E,01	OPEN K	LD E, 1	
5328 18,06		JR 6 (5336) OPEN END	
OPEN S SUBROUTINE			
5330 1E,06	OPEN S	LD E, 6	
5332 18,02		JR 2 (5336) OPEN END	
OPEN P SUBROUTINE			
5334 1E,10	OPEN P	LD E, 16	
5336 0B	OPEN END	DEC BC	
5337 78		LD A, B	
5338 B1		OR C	BC =0?
5339 C2,70,14		JP NZ 5232	ERR F
5342 57		LD D, A	
5343 E1		POP HL	
5344 C9		RET	
LIST AND LLIST COMMAND ROUTINES			
5345 ED,73,3F,5C	AUTO LIST	LD (23615), SP	LIST SP
5349 FD,36,02,10		LD (IY+2), 16	SET AUTO LIST
5353 CD,EA,08		CALL 2282	CLS
5356 FD,CB,02,06		SET 0, (IY+2)	USE BOTTOM SCREEN
5360 FD,46,31		LD B, (IY+49)	DF SIZE
5363 CD,7F,09		CALL 2431	CLS-L
5366 FD,CB,02,86		RES 0, (IY+2)	USE TOP SCREEN
5370 FD,CB,30,C6		SET 0, (IY+48)	AUTO LIST ON
5374 2A,49,5C		LD HL, (23625)	E PPC
5377 ED,5B,6C,5C		LD DE, (23660)	S TOP
5381 A7		AND A	CLEAR CARRY
5382 ED,52		SBC HL, DE	
5384 19		ADD HL, DE	
5385 38,22		JR C, 34 (5421)	SET TOP LINE #
5387 D5		PUSH DE	
5388 CD,D6,16		CALL 5846	FIND LINE ADDR
5391 11,C0,02		LD DE, 704	ABOUT A SCREEN FULL
5394 EB		EX DE, HL	
5395 ED,52		SBC HL, DE	GO BACK A SCREEN
5397 E3		EX (SP), HL	
5398 CD,D6,16		CALL 5846	FIND LINE ADDR
5401 C1		POP BC	
5402 C5	FIND LINE LOOP	PUSH BC	
5403 CD,20,17		CALL 5920	RECORD LENGTH (NEXT 1)
5406 C1		POP BC	

5407 09		ADD HL, BC
5408 38,0E		JR C, 14 (5424) GET TOP LINE #
5410 EB		EX DE, HL
5411 56		LD D, (HL) NEXT LINE ADDR
5412 23		INC HL
5413 5E		LD E, (HL)
5414 2B		DEC HL
5415 ED,53,6C,5C		LD (23660), DE S TOP SAVE NEW #
5419 18,ED		JR 237 (5402) FIND LINE LOOP
5421 22,6C,5C	SET TOP LINE #	LD (23660), HL S TOP
5424 2A,6C,5C	GET TOP LINE #	LD HL, (23660)
5427 CD,D6,16		CALL 5846 FIND LINE ADDR
5430 28,01		JR Z, 1 (5433) CALL FLAG EARLIER
5432 EB		EX DE, HL
5433 CD,7F,15	CALL FLAG EARLIER	CALL 5503 FLAG EARLIER
5436 FD,CB,02,A6		RES 4, (IY+2) AUTO LIST OFF
5440 C9		RET

LLIST ENTRY POINT

5441 3E,03	K-LLIST	LD A, 3 USE STREAM 3
5443 18,02		JR 2 (5447) LIST-1

LIST ENTRY POINT

5445 3E,02	K-LIST	LD A, 2 USE STREAM 2
5447 FD,36,02,00	LIST-1	LD (IY+2), 0 RESET TV FLAGS
5451 CD,89,28		CALL 10377 INTERPRET?
5454 C4,30,12		CALL NZ, 4656 SELECT CHAN
5457 DF		RST 24 GET CHAR
5458 CD,0F,22		CALL 8917 STRITO (STREAM ALTER?)
5461 38,14		JR C, 20 (5483) GET LIST LINE
5463 DF		RST 24 GET CHAR
5464 FE,3B		CP 59 ;?
5466 28,04		JR Z, 4 (5472) GET NEXT CHAR
5468 FE,2C		CP 44 '?
5470 20,06		JR NZ, 6 (5478) USE LINE 0
5472 E7	GET NEXT CHAR	RST 32 NEXT CHAR
5473 CD,E5,1B		CALL 7141 TEM 6
5476 18,08		JR 8 (5486) EDITING?
5478 CD,51,1C	USE LINE 0	CALL 7249 STK ZERO
5481 18,03		JR 3 (5486) EDITING?
5483 CD,49,1C	GET LIST LINE	CALL 7241 OPT NO (GET #)
5486 CD,44,1B	EDITING?	CALL 6980 END?
5489 CD,23,1F		CALL 7971 FIX U GET SINGLE #
5492 78		LD A, B
5493 E6,3F		AND 63 SAVE 5 LOW BITS
5495 67		LD H, A
5496 69		LD L, C
5497 22,49,5C		LD (23625), HL E PFC
5500 CD,D6,16		CALL 5846 FIND LINE ADDR
5503 1E,01	FLAG EARLIER	LD E, 1
5505 CD,B1,15	LIST ALL	CALL 5537 PUT STRING (LINE)
5508 D7		RST 16 PRINT CHAR
5509 FD,CB,02,66		BIT 4, (IY+2) AUTO LIST?
5513 28,F6		JR Z, 246 (5505) LIST ALL
5515 3A,6B,5C		LD A, (23659) DF Size


```

5518 FD,96,4F
5521 20,EE
5523 AB
5524 C8
5525 E5          INSERT NEW LINE
5526 D5
5527 21,6C,5C
5530 CD,5B,16
5533 D1
5534 E1
5535 18,E0
SUB (IY+79) PRINT LINE #
JR NZ, 238 (5505) SCREEN NOT FULL
XOR E
RET Z
PUSH HL IF CURRENT LINE MISSING
PUSH DE CHANGE S TOP AND ADD IT
LD HL, 23660 AT S TOP
CALL 5723 NEXT LINE
POP DE
POP HL
JR 224 (5505) LIST ALL

```

PRINT A WHOLE BASIC LINE SUBROUTINE

```

5537 ED,4B,49,5C PUT STR(LINE) LD BC, (23625) E PPC
5541 CD,E8,16          CALL 5864 CP BC (LINES)
5544 16,3E          LD D, 62 ">"
5546 28,05          JR Z, 5 (5553) SAVE LINE MARKER
5548 11,00,00          LP 0 LD DE, 0
5551 CB,13          RL E E=1 IF BEFORE, 0 IF AFTER
5553 FD,73,2D SAVE LINE MARKER LD (IY+45), E STORE IN B REG
5556 7E          LD A, (HL)
5557 FE,40          CP 64 LISTING FINISHED?
5559 C1          POP BC
5560 D0          RET NC
5561 C5          PUSH BC
5562 CD,95,17 PRINT LINE # CALL 6037 PUT LINE #
5565 23          INC HL
5566 23          INC HL SKIP LENGTH
5567 23          INC HL
5568 FD,CB,01,86 RES 0, (IY+1) SUPPRESS SPACE OFF
5572 7A          LD A, D
5573 A7          AND A CLEAR CARRY
5574 28,05          JR Z, 5 (5581) PRINT LINE-1
5576 D7          RST 16 PRINT CHAR
5577 FD,CB,01,C6 PRINT LINE SET 0, (IY+1) SUPPRESS SPACE ON
5581 D5          PRINT LINE-1 PUSH DE
5582 EB          EX DE, HL
5583 FD,CB,30,96 RES 2, (IY+48) INSIDE STRING OFF
5587 21,3B,5C LD HL, 23611 AT FLAGS
5590 CB,96 RES 2, (HL) K MODE
5592 FD,CB,37,6E BIT 5, (IY+55) INPUT?
5596 28,02 JR Z, 2 (5600) SYNTAX ERROR?
5598 CB,D6 SET 2, (HL) L MODE
5600 2A,5F,5C SYNTAX ERROR? LD HL, (23647) X PNTR TIME FOR
5603 A7          AND A CLEAR CARRY SYN ERR CUR?
5604 ED,52          SBC HL, DE
5606 20,05 JR NZ, 5 (5613) PRINT CURSOR?
5608 3E,3F LD A, 63 FLASHING "?"
5610 CD,0D,16 CALL 5645 FLASH A
5613 CD,2D,16 PRINT CURSOR? CALL 5677 PRINT CURSOR
5616 EB          EX DE, HL
5617 7E          LD A, (HL)
5618 CD,02,16 CALL 5634 SKIP SLUG PRINT
5621 23          INC HL
5622 FE,0D          CP 13 ENTER?

```

```

5624 28,06      JR Z, 6 (5630) PRINT LINE END
5626 EB        EX DE, HL
5627 CD,83,16   CALL 5763 OUT CHAR
5630 18,EO      JR 224 (5600) SYNTAX ERR?
5632 D1        PRINT LINE END   POP DE
5633 C9        RET

```

SKIP SLUG (FP NUMBER) SUBROUTINE

```

5634 FE,OE      SKIP SLUG PRINT   CP 14 SLUG?
5636 C0        RET NZ
5637 23        INC HL
5638 23        INC HL
5639 23        INC HL
5640 23        INC HL
5641 23        INC HL
5642 23        INC HL
5643 73        LD A, (HL)
5644 C9        RET

```

PRINT A FLASHING CHARACTER SUBROUTINE

```

5645 D9        FLASH A CHAR      EXX
5646 2A,8F,5C   LD HL, (23695) H=ATTR T/L=MASK T
5649 E5        PUSH HL
5650 CB,BC      FLASH OFF      RES 7, H
5652 CB,FD      SET 7, L
5654 22,8F,5C   LD (23695), HL RELOAD
5657 21,91,5C   LD HL, 23697 AT P FLAG
5660 56        LD D, (HL) TO D
5661 D5        PUSH DE SAVE IT
5662 36,00      LD (HL), 0 CLEAR P FLAG
5664 CD,00,05   CALL 1280 SEND TV
5667 E1        POP HL
5668 FD,74,57   LD (IY+87), H RESTORE P FLAG
5671 E1        POP HL RESTORE ATTR T/MASK T
5672 22,8F,5C   LD (23695), HL
5675 D9        EXX
5676 C9        RET

```

PRINT THE CURSOR ROUTINE

```

5677 2A,5B,5C   PRINT CURSOR   LD HL, (23643) CUR ADDR
5680 A7        AND A CLEAR CARRY
5681 ED,52      SBC HL, DE
5683 C0        RET NZ
5684 3A,41,5C   LD A, (23617) MODE
5687 CB,07      RLC A
5689 28,04      JR Z, 4 (5695) SKIP SET
5691 C6,43      SET E & G      ADD A, 67 E OR G
5693 18,16      JR 22 (5717) PRINT CUR END
5695 21,3B,5C   SKIP SET      LD HL, (23611)
5698 CB,9E      RES 3, (HL) K MODE
5700 3E,4B      LD A, 75 K
5702 CB,56      BIT 2, (HL) TO PRINTER?
5704 28,0B      JR Z, (5717) PRINT CUR END
5706 CB,DE      SET 3, (HL) L MODE
5708 3C        INC A (NOW L)

```

5709	FD, CB, 30, 5E		BIT 3, (IY+48) SHIFT ON?
5713	28, 02		JR Z, 2 (5717) PRINT CUR END
5715	3E, 43		LD A, 67 C
5717	D5	PRINT CUR END	PUSH DE
5718	CD, OD, 16		CALL 5645 FLASH A
5721	D1		POP DE
5722	C9		RET
FIND NEXT LINE SUBROUTINE			
5723	5E	NEXT LINE	LD E, (HL)
5724	23		INC HL
5725	56		LD D, (HL) LINE LEN IN DE
5726	E5		PUSH HL
5727	EB		EX DE, HL
5728	23		INC HL
5729	CD, D6, 16		CALL 5846 FIND LINE ADDR
5732	CD, 24, 13		CALL 4900 GET LINE
5735	E1		POP HL
5736	FD, CB, 37, 6E	STORE LINE	BIT 5, (IY+55) INPUT?
5740	C0		RET NZ
5741	72		LD (HL), D INSERT LINE LENGTH
5742	2B		DEC HL IN INPUT LINE
5743	73		LD (HL), E
5744	C9		RET
PRINTING CHARACTERS IN A BASIC LINE SUBROUTINE			
5745	7B	print CHAR in line	LD A, E 32 = SPACE, 255 = NONE
5746	A7		AND A CLEAR FLAGS
5747	F8		RET N CHAR >127
5748	18, OD		JR 13 (5763) OUT CHAR
5750	AF	OUT SPACE #	XOR A CLEAR A & CARRY
5751	09	OUT SPACE LOOP	ADD HL, DE
5752	3C		INC A COUNT EACH TRIAL
5753	38, FC		JR C, 252 (5751) OUT SPACE LOOP
5755	ED, 42		SBC HL, DE
5757	3D		DEC A
5758	28, F1		JR Z, 241 (5745) PRINT CHAR
5760	C3, EA, 11		JP 4586 PUT DIGET (OUT CODE)
5763	FD, CB, 01, A6	OUT CHAR	RES 4, (IY+1) TOKEN OFF
5767	FD, CB, 01, 56		BIT 2, (IY+1) MODE?
5771	28, 04		JR Z, 4 (5777) NUMERIC?
5773	FD, CB, 01, E6		SET 4, (IY+1) TOKEN ON
5777	CD, D9, 30	NUMERIC?	CALL 12505 DIGET?
5780	30, 3E		JR NC, 62 (5844) PRINT CHAR
5782	FE, 0C		CP 12 DELETE?
5784	28, 36		JR Z, 54 (5840) SET L MODE
5786	FE, 21		CP 33 SPACE OR LESS?
5788	38, 36		JR C, 54 (5844) PRINT CHAR
5790	FD, CB, 01, 96		RES 2, (IY+1) K MODE
5794	FE, 7B		CP 123 ON ERR?
5796	20, 06		JR NZ, 6 (5804) THEN?
5798	FD, CB, 01, 66		BIT 4, (IY+1) TOKEN OR SLUG?
5802	28, 28		JR Z, 40 (5844) PRINT CHAR
5804	FE, CB	THEN?	CP 203 THEN?
5806	28, 24		JR Z, 36 (5844) PRINT CHAR

```

5808 FE,3A          CP 58 :?
5810 20,0E...      JR NZ, CK QUOTE
5812 FD,CB,37,6E    DO :   BIT 5, (IY+55) INPUT?
5816 20,16          JR NZ, 22 (5840) SET L MODE
5818 FD,CB,30,56    BIT 2, (IY+48) INSIDE STRING?
5822 28,14          JR NZ, 20 (5844) SET L MODE
5826 FE,22          CK QUOTE CP 34 "?"
5828 20,0A          JR NZ, 10 (5840) SET L MODE
5830 F5            SET/RESET STREAM PUSH AF
5831 3A,6A,5C       LD A, (23658) FLAGS 2
5834 EE,04          XOR 4  FLIP INSIDE QUOTE
5836 32,6A,5C       LD (23658), A  RELOAD IT
5839 F1            POP AF
5840 FD,CB,01,D6    SET L MODE SET 2, (IY+1) L MODE ON
5844 D7            PRINT CHAR RST 16 PRINT CHAR
5845 C9            RET

```

LINE ADDRESS SUBROUTINE

```

5846 E5            FIND LINE ADDR  PUSH HL
5847 2A,53,5C      LD HL, (23635) PROG START
5850 54            LD D, H
5851 5D            LD E, L
5852 C1            FIND LINE LOOP  POP BC
5853 CD,E8,16      CALL 5864  CP-BC (LINE #'S)
5856 D0            RET NC  FOUND
5857 C5            PUSH BC
5858 CD,20,17 GO TO NEXT LINE  CALL 5920 RECORD LENGTH(NEXT 1)
5861 EB            EX DE, HL
5862 18,F4         JR 244 (5852) FIND LINE LOOP

```

COMPARE LINE NUMBERS SUBROUTINE

```

5864 7E            CP-BC(LINES)  LD A, (HL)
5865 B8            CP B
5866 C0            RET NZ, HIGH BYTES <>
5867 23            INC HL
5868 7E            LD A, (HL)
5869 2B            DEC HL RESTORE HL TO 1ST BYTE
5870 B9            CP C  CARRY SET IF TOO LOW
5871 C9            RET

```

FIND EACH STATEMENT SUBROUTINE

```

5872 23            FIND SUB LINE  INC HL  (NOT USED)
5873 23            INC HL
5874 23            INC HL
5875 22,5D,5C  EACH STATEMENT  LD (23645), HL CHAR ADDR
5878 0E,00        LD C, 0
5880 15            LOOP  DEC D  D=# WANTED COUNTS
5881 C8            RET Z  FOUND  DOWN TO ZERO
5882 E7            RST 32  NEXT CHAR
5883 BB            CP E  THE TOKEN WANTED
5884 20,04        JR NZ, 4 (5890) SKIP SLUG?
5886 A7            AND A  CLEAR FLAGS
5887 C9            RET
5888 23            NEXT CODE  INC HL
5889 7E            LD A, (HL)

```

```

5890 CD,02,16 SKIP SLUG?
5893 22,5D,5C
5896 FE,22
5898 20,01
5900 OD
5901 FE,3A          TRY :
5903 28,04
5905 FE,CB
5907 20,04
5909 CB,41          QUOTE?
5911 28,DF
5913 FE,OD          END?
5915 20,E3
5917 15
5918 37
5919 C9

CALL 5634 SKIP SLUG?
LD (23645), HL CHAR ADDR
CP 34 "?"
JR NZ, 1 (5901) TRY :
DEC C
CP 58 :?
JR Z, 4 (5907) QUOTE?
CP 203 THEN?
JR NZ, 4 (5913) END?
BIT 0, C
JR Z, 223 (5880) LOOP
CP 13 ENTER?
JR NZ, 227 (5888) NEXT CODE
DEC D
SCF
RET

```

```

FIND NEXT ONE (LINE/VARIABLE) SUBROUTINE
5920 E5          RECORD LENGTH
5921 7E
5922 FE,40
5924 38,17
5926 CB,6F      VARIABLE SEARCH
5928 28,14
5930 87          NUMERIC OR FOR
5931 FA,2F,17
5934 3F
5935 01,05,00    SIMPLE VAR
5938 30,02
5940 0E,12
5942 17          NAME LOOP
5943 23
5944 7E
5945 30,FB
5947 18,06
5949 23          LINE SEARCH
5950 23          GET LENGTH
5951 4E
5952 23
5953 46
5954 23
5955 09          NEXT VAR/LINE
5956 D1

PUSH HL
LD A, (HL)
CP 64 LINE SEARCH?
JR C, 23 (5949) LINE SEARCH
BIT 5, A STR$ OR ARRAY?
JR Z, 20 (5950) GET LENGTH
ADD A, A DOUBLE CODE
JP N 5935 SIMPLE VAR
CCF LONG NAME NUMERIC ONLY
LD BC, 5 NEEDS 5 SPACES
JR NC, 2 (5942) NAME LOOP
LD C, 18 FOR NEEDS 18 SPACES
RL A
INC HL GET NEXT CHAR
LD A, (HL)
JR NC, 251 (5942) NAME LOOP
JR 6 (5955) NEXT VAR/LINE
INC HL SKIP LINE # BYTE
INC HL
LD C, (HL)
INC HL
LD B, (HL) BC = LENGTH
INC HL
ADD HL, BC HL AT NEXT VAR/LINE
POP DE

```

```

LENGTH DIFFERENCE SUBROUTINE
5957 A7          DIFFERENCE
5958 ED,52
5960 44
5961 4D
5962 19
5963 EB
5964 C9

AND A CLEAR FLAGS
SBC HL, DE
LD B, H
LD C, L
ADD HL, DE
EX DE, HL
RET

```

```

RECLAIM (DELETE) SUBROUTINE
5965 CD,45,17 DEL-DE RECLAIM-1) CALL 5957 DIFFERENCE

```

5968 C5	RECLAIM-2	PUSH BC	SAVE DIFFERENCE
5969 78		LD A, B	
5970 2F		CPL	2s compliment
5971 47		LD E, A	
5972 79		LD A, C	
5973 2F		CPL	
5974 4F		LD C, A	
5975 03		INC BC	
5976 C5		PUSH BC	
5977 CD,CA,12		CALL 4810 REMG SZ	(RESET POINTERS
5980 E3		EX (SP), HL	
5981 09		ADD HL, BC	
5982 4D		LD C, L	
5983 44		LD B, H	
5984 D1		POP DE	
5985 E1		POP HL	
5986 19		ADD HL, DE	
5987 D5		PUSH DE	
5988 ED,B0		LDIR	
5990 E1		POP HL	
5991 C9		RET	

EDIT LINE NUMBER SUBROUTINE

5992 2A,59,5C	EDIT LINE #	LD HL, (23641) E LINE
5995 2B		DEC HL
5996 22,5D,5C		LD (23645), HL CHAR ADDR
5999 E7		RST 32 NEXT CHAR
6000 21,92,5C		LD HL, 23698 AT MEM BOTTOM
6003 22,65,5C		LD (23653), HL STK END
6006 CD,F9,30		CALL 12537 ININT (INT TO FP)
6009 CD,60,31		CALL 12640 FP TO BC
6012 38,04		JR C, 4 (6018) OVER 65536
6014 21,F0,D8		LD HL, 55536 = -10000
6017 09		ADD HL, BC
6018 DA,ED,1B	OVER 65536	JP C, 7149 SYN ERR
6021 C3,54,13		JP 4948 RESET STK

REPORT AND LINE NUMBER PRINTING SUBROUTINE

6024 D5	PUT BC	PUSH DE
6025 E5		PUSH HL
6026 AF		XOR A CLEAR A & CARRY
6027 CB,78		BIT 7, B
6029 20,20		JR NZ, 32 (6063) PRINT 1 DIGET
6031 60		LD H, B
6032 69		LD L, C
6033 1E,FF		LD E, 255 NO LEADING SPACES
6035 18,08		JR 8, (6045) PRINT #
6037 D5	PUT LINE	PUSH DE
6038 56		LD D, (HL)
6039 23		INC HL
6040 5E		LD E, (HL)
6041 E5		PUSH HL
6042 EB		EX DE, HL
6043 1E,20		LD E, 32 LEADING SPACE NEEDED
6045 01,18,FC	PRINT #	LD BC, 64536 = - 1000


```

6048 CD,76,16
6051 01,9C,FF
6054 CD,76,16
6057 0E,F6
6059 CD,76,16
6062 7D
6063 CD,EA,11 PRINT SINGLE #
6066 E1
6067 D1
6068 C9

```

```

CALL 5750 OUT SPACE #
LD BC, 65436 = - 100
CALL 5750 OUT SPACE #
LD C, 246 = - 10
CALL 5750 OUT SPACE #
LD A, L
CALL 4586 PUT DIGET
POP HL
POP DE
RET

```

AROS INITIALIZATION ROUTINE

```

6069 C5          AROS (CART)
6070 01,00,FF
6073 CD,99,64
6076 C1
6077 CD,BB,12
6080 2A,BC,5C
6083 11,04,00
6086 19
6087 7E
6088 06,00
6090 4F
6091 CD,99,64
6094 C9

```

```

PUSH BC
LD BC, 65280 B=255 = BANK #
CALL 25753 BANK ENABLE
POP BC
CALL 4795 INSERT BC SPACES
LD HL, (23740) SYS CONFIG
LD DE, 4
ADD HL, DE
LD A, (HL) BANK #
LD B, 0
LD C, A
CALL 25753 BANK ENABLE
RET

```

AROS GET A LINE SUBROUTINE

```

6095 2A,BC,5C    GET A LINE
6098 23
6099 23
6100 5E
6101 23
6102 56
6103 EB
6104 7E    GET AROS LINE-LOOP
6105 B8
6106 20,04
6108 23
6109 7E
6110 2B
6111 B9
6112 D0          NOT ADDR
6113 23
6114 23
6115 5E
6116 23
6117 56
6118 23
6119 19
6120 18,EE
6122 E5          AROS LINE
6123 2A,BC,5C
6126 11,04,00
6129 19
6130 7E

```

```

LD HL, (23740) SYS CONF
INC HL
INC HL
LD E, (HL)
INC HL
LD D, (HL)
EX DE, HL HL=LINE #
LD A, (HL)
CP B          HIGH BYTE =?
JR NZ, 4 (6112) NOT ADDR
INC HL
LD A, (HL)
DEC HL
CP C          LOW BYTE =?
RET NC        FOUND
INC HL
INC HL
LD E, (HL) GET LENGTH
INC HL
LD D, (HL)
INC HL      AT TOKEN
ADD HL, DE  AT NEXT LINE
JR 238 (6104) GET AROS LINE-LOOP
PUSH HL
LD HL, (23740) SYS CONFIG
LD DE, 4
ADD HL, DE  CURRENT AROS LINE
LD A, (HL) GET BANK

```

6131 4F		LD C, A	SETUP BANK ENABLE
6132 06,00		LD B, 0	
6134 CD,99,64		CALL 25753	BANK ENABLE
6137 C1		POP BC	
6138 CD,CF,17		CALL 6095	GET A AROS LINE
6141 18,19		JR 25 (6168)	AROS NEXT-1
6143 CD,89,28	AROS NEXT	CALL 10377	INTERPRET?
6146 C8		RET Z	
6147 2A,BC,5C		LD HL, (23740)	SYS CON TABLE ADDR
6150 11,04,00		LD DE, 4	
6153 19		ADD HL, DE	CURRENT AROS LINE
6154 7E		LD A, (HL)	LD COMMAND
6155 4F		LD C, A	SETUP BANK ENABLE
6156 06,00		LD B, 0	
6158 CD,99,64		CALL 25753	BANK ENABLE
6161 2A,55,5C		LD HL, (23637)	NEXT LINE ADDR
6164 FD,36,0A,00		LD (IY+10), 0	NSPFC
6168 7E	AROS NEXT-1	LD A, (HL)	
6169 E6,C0		AND 192	SAVE ONLY 2 HIGH BYTES
6171 28,07		JR Z, 7 (6180)	GET LINE ADDR
6173 01,00,FF		LD BC, BANK #=255	
6176 CD,99,64		CALL 25753	BANK ENABLE
6179 C9		RET	
6180 56	GET LINE ADDR	LD D, (HL)	
6181 23		INC HL	
6182 5E		LD E, (HL)	
6183 ED,53,45,5C		LD (23621), DE	PFC
6187 23		INC HL	
6188 56		LD D, (HL)	GET LINE LENGTH
6189 23		INC HL	
6190 56		LD E, (HL)	
6191 23		INC HL	AT TOKEN
6192 E5		PUSH HL	
6193 19		ADD HL, DE	GET NEXT LINE ADDR
6194 22,55,5C		LD (23637), HL	NEXT LINE
6197 D5		PUSH DE	SAVE LINE LENGTH
6198 2A,4F,5C		LD HL, (23651)	CHANS
6201 2B		DEC HL	
6202 ED,5B,C4,5C		LD DE, (23748)	AROS POINTER
6206 A7		AND A	CLEAR FLAGS
6207 ED,52		SBC HL, DE	
6209 11,D0,00		LD DE, 208	
6212 EB		EX DE, HL	
6213 A7		AND A	CLEAR FLAGS
6214 ED,52		SBC HL, DE	
6216 30,24		JR NC, 36 (6254)	AROS NEXT-1
6218 7D		LD A, L	
6219 2F		CPL	COMPLIMENT HL AND MOVE
6220 4F		LD C, A	TO BC
6221 7C		LD A, H	
6223 47		LD B, A	
6224 03		INC BC	
6225 03		INC BC	
6226 2A,C4,5C		LD HL, (23748)	AROS POINTER
6229 C5		PUSH BC	

6230 01,00,FF		LD BC, B=255 BANK #
6233 CD,99,64		CALL 25753 BANK ENABLE
6236 C1		POP BC
6237 CD,50,17		CALL 5968 DEL REC (RECLAIM-2)
6240 2A,BC,5C		LD HL, (23740) SYS CON
6243 11,04,00		LD DE, 4
6246 19		ADD HL, DE CURRENT AROS LINE
6247 7E		LD A, (HL) GET BANK #
6248 06,00		LD B, 0
6250 4F		LD C, A
6251 CD,99,64		CAL 25753 BANK ENABLE
6254 E1	AROS NEXT-3	POP HL
6255 E5		PUSH HL
6256 11,CF,00		LD DE, 207
6259 2B		DEC HL
6260 A7		AND A CLEAR FLAGS
6261 ED,52		SBC HL, DE
6263 38,0A		JR C, 10 (6275) AROS NEXT-4
6265 4D		LD C, L
6266 44		LD B, H
6267 03		INC BC
6268 2A,4F,5C		LD HL, (23631) PPC
6271 2B		DEC HL
6272 CD,B5,17		CALL 6069 AROS
6275 C1	AROS NEXT-4	POP BC
6276 D1		POP DE
6277 21,FF,00		LD HL, 255
6280 E5		PUSH HL
6281 D5		PUSH DE
6282 2A,C4,5C		LD HL, (23748) AROS POINTER
6285 36,0D		LD (HL), 13 ENTER
6287 22,5D,5C		LD (23645), HL CHAR ADDR
6290 23		INC HL
6291 E5		PUSH HL SETUP XFER BYTES
6292 C5		PUSH BC
6293 01,00,00		LD BC, 1
6296 C5		PUSH BC
6297 CD,22,67		CALL 26402 XFER BYTES
6300 FD,7E,0A		LD A, (IY+10) NS PPC
6303 FD,36,0A,FF		LD (IY+10), 255
6307 FE,01		CP 1 1ST STATEMENT?
6309 CE,00		ADC A, 0 ADD 1 IF 0
6311 3D		DEC A THEN SUBTRACT 1
6312 F5		PUSH AF SAVE NS PPC
6313 32,47,5C		LD (23623), A SUB PPC
6316 FD,36,00,FF		LD (IY+0), 255 ERR #
6320 01,00,FF		LD BC, B=255 BANK #
6323 CD,99,64		CALL 25753 BANK ENABLE
6326 F1		POP AF
6327 CA,44,1A		JP Z, 6724 STATEMENT LOOP
6330 3C		INC A INCREASE STATEMENT #
6331 57		LD D, A SETUP FIND SUBLINE
6332 1E,00		LD E, 0
6334 CD,F3,16		CALL 5875 FIND SUB LINE 1
6337 CA,4A,1B		JP Z, 6986 END TEM

6340 CF	ERR N	RST 8 ERROR
6341 16		N-STATEMENT LOST
AROS ENTRY POINT		
6343 21,C6,5C	AROS	LD HL, 23750 AT AROS FLAGS
6345 36,80		LD (HL), 128 SET CART PRESENT
6347 01,D0,00		LD BC, 208
6350 21,40,68		LD HL 26688 AT CHAN TABLE
6353 2B		DEC HL
6354 CD,BB,12		CALL 4795 INSERT BC SPACES
6357 21,40,68		LD HL, 26688 SET AROS POINTER
6360 22,C4,5C		LD (23748), HL AROS POINTER
6363 2A,BC,5C		LD HL, (23740) SYS CON
6366 11,06,00		LD BC, 6
6369 19		ADD HL, DE
6370 4E		LD C, (HL)
6371 23		INC HL
6372 46		LD B, (HL)
6373 21,40,68		LD HL, 26688 CHAN TABLE
6376 2B		DEC HL
6377 CD,BB,12		CALL 4795 INSET BC SPACES
6380 2A,BC,5C		LD HL, (23740) AROS POINTER
6383 11,04,00		LD DE, 4
6386 19		ADD HL, DE
6387 7E		LD A, (HL)
6388 06,00		LD B, 0
6390 4F		LD C, A
6391 CD,99,64		CALL 25753 BANK ENABLE
6294 2A,BC,5C		LD HL, (23740) SYS CON
6397 23		INC HL
6398 23		INC HL
6399 5E		LD E, (HL)
6400 23		INC HL
6401 56		LD D, (HL)
6402 EB		EX DE, HL
6403 56		INC HL
6405 5E		LD E, (HL)
6406 01,00,FF		LD BC, B=255 BANK #
6409 CD,99,64		CALL 25753 BANK ENABLE
6412 2A,BC,5C		LD HL, (23740) SYS CON
6415 01,05,00		LD BC, 5
6418 09		ADD HL, BC
6419 7E		LD A, (HL)
6420 FE,00		CP 0
6422 28,29		JR Z, 41 AROS END
6424 ED,53,42,5C		LD (23618), DE NEW PFC
6428 CD,A6,08		CALL 2214 K CLS
6431 2A,BC,5C		LD HL, (23740) SYS CON
6434 23		INC HL
6435 23		INC HL
6436 5E		LD E, (HL)
6437 23		INC HL
6438 56		LD D, (HL)
6439 EB		EX DE, HL
6440 2B		DEC HL

6441 22,57,5C		LD (23639), HL DATA ADDR
6444 FD,36,00,FF		LD (IY+0), 255 RSET ERR #
6448 FD,CB,01,FE		SET 7, (IY+1) REG INTERPRET
6452 FD,36,0A,00		LD (IY+10), 0 NS PPC
6456 21,8D,0E		LD HL, 3725 LED 4 (MAIN-4)
6459 E5		PUSH HL
6460 21,B9,1A		LD HL, 6841 END STATEMENT
6463 FB		EI
6464 E9		JP (HL)
6465 FB	ARDS END	EI
6466 C2,2F,0E		JP 3631 MIN EXECUTION-1

BASIC LINE AND COMMAND INTERPRETATION

SYNTAX OFFSET TABLE

6469 B5	DEF FN	6650
6470 D0	CAT	6678
6471 C0	FORMAT	6663
6472 C4	MOVE	6668
6473 C8	ERASE	6673
6474 B3	OPEN #	6653
6475 B8	CLOSE #	6659
6476 97	MERGE	6627
6477 95	VERIFY	6625
6478 96	BEEP	6628
6479 99	CIRCLE	6632
6480 9C	INK	6636
6481 9C	PAPER	6637
6482 9C	FLASH	6638
6483 9C	BRIGHT	6639
6484 9C	INVERSE	6640
6485 9C	OVER	6641
6486 9C	OUT	6642
6487 83	LPRINT	6618
6488 85	LLIST	6621
6489 32	STOP	6539
6490 70	READ	6602
6491 72	DATA	6605
6492 74	RESTORE	6608
6493 4C	NEW	6569
6494 98	BORDER	6646
6495 5A	CONTINUE	6585
6496 43	DIM	6563
6497 45	REM	6566
6498 2F	FOR	6545
6499 1B	GO TO	6526
6500 23	GOSUB	6535
6501 3B	INPUT	6560
6502 7B	LOAD	6525
6503 48	LIST	6575
6504 13	LET	6523
6505 5D	PAUSE	6598
6506 2F	NEXT	6553
6507 47	POKE	6578
6508 31	PRINT	6557
6509 55	PLOT	6594

6510 3E
 6511 71
 6512 46
 6513 11
 6514 4D
 6515 60
 6516 48
 6517 19
 6518 61
 6519 A4
 6520 A6
 6521 A8
 6522 AA

RUN 6572
 SAVE 6624
 RANDOMIZE 6582
 IF 6530
 CLS 6591
 DRAW 6611
 CLEAR 6588
 RETURN 6542
 COPY 6615
 ON ERR 6683
 STICK 6686
 RESET 6689
 SOUND 6692

PARAMETER TABLE

6523 01,3D,02
 6526 06,00
 F1,1E
 6530 06,CB,05
 5B,1C
 6535 06,00
 99,1F
 6539 00
 59,1C
 6542 00
 D4,1F
 6545 04,3D,06,CC,06,05
 78,1C

 6553 04,00
 55,1D
 6557 05
 59,21
 6560 05
 2B,22
 6563 05
 C0,2F
 6566 05
 00,1B
 6569 0D
 1D,0D
 6572 03
 2B,1F
 6575 05
 45,15
 6578 08,0D
 0A,1F
 6582 03
 D4,1E
 6585 00
 E4,1E
 6588 03
 36,1F
 6591 00
 A6,0B

P-LET CLASS 1,"=", CLASS 2
 P-GO TO CLASS 6, CLASS 0
 JUMP 7921
 P-IF CLASS 6, THEN, CLASS 5
 IF 7259
 P-GOSUB CLASS 6, CLASS 0
 GOSUB 8089
 P-STOP CLASS 0
 STOP 7257
 P-RETURN CLASS 0
 RETURN 8148
 P-FOR CLASS 4,"=", CLASS 6,
 TO, CLASS 6, CLASS 5
 FOR 7288
 P-NEXT CLASS 4, CLASS 0
 NEXT 7509
 P-PRINT CLASS 5
 PRINT 8537
 P-INPUT CLASS 5
 INPUT 8738
 P-DIM CLASS 5
 DIM 12224
 P-REM CLASS 5
 REM 6912
 P-NEW CLASS 13
 NEW 3357
 P-RUN CLASS 3
 RUN 7979
 P-LIST CLASS 5
 LIST 5445
 P-POKE CLASS 8, CLASS 13
 POKE 7951
 P-RANDOMIZE CLASS 3
 RANDOMIZE 7892
 P-CONTINUE CLASS 0
 CONTINUE 7908
 P-CLEAR CLASS 3
 CLEAR 7990
 P-CLS CLASS 0
 CLS 2214

6594 09,00		P-PLOT	CLASS 9, CLASS 0
35,26			PLOT 9781
6598 06,00		P-PAUSE	CLASS 6, CLASS 0
EB,1F			PAUSE 8171
6602 05		P-READ	CLASS 5
97,1D			READ 7575
6605 05		P-DATA	CLASS 5
82,1E			DATA 7810
6608 03		P-RESTORE	CLASS 3
9D,1E			RESTORE 7837
6611 09,05		P-DRAW	CLASS 9, CLASS 5
DB,26			DRAW 9947
6615 00		P-COPY	CLASS 0
02,0A			COPY = K-DUMP 2562
6618 05		P-LPRINT	CLASS 5
5,21			LPRINT 8533
6621 05		P-LLIST	CLASS 5
41,15			LLIST 5441
6624 0B	TEM 38	P-SAVE	CLASS 11
6625 0B	TEM 39	P-LOAD	CLASS 11
6626 0B		P-VERIFY	CLASS 11
6627 0B		P-MERGE	CLASS 11
6628 08,00		P-BEEP	CLASS 8, CLASS 0
36,04			BEEP 1078
6632 09,05		P-CIRCLE	CLASS 9, CLASS 0
79,26			CIRCLE 9849
6636 07		P-INK	CLASS 7
6637 07		P-PAPER	CLASS 7
6638 07		P-FLASH	CLASS 7
6639 07		P-BRIGHT	CLASS 7
6640 07		P-INVERSE	CLASS 7
6641 07		P-OVER	CLASS 7
6642 08,00		P-OUT	CLASS 8, CLASS 0
04,1F			OUT 7940
6646 06,00		P-BORDER	CLASS 6, CLASS 0
3E,24			BORDER 9278
6650 05		P-DEF FN	CLASS 5
1D,20			DEF FN 8221
6653 06,2C,0A,05		P-OPEN #	CLASS 6, ",", " , CLASS 10
2A,14			CLASS 5
			OPEN # 5162
6659 06,00		P-CLOSE #	CLASS 6, CLASS 0
9F,13			CLOSE # 5023
6663 0A,2C,05		P-FORMAT	CLASS 10, ",", " , CLASS 5
CC,25			FORMAT 9676
6668 0A,2C,05		P-MOVE	CLASS 10, ",", " , CLASS 5
D0,25			MOVE 9680
6673 0A,2C,05		P-ERASE	CLASS 10, ",", " , CLASS 5
D4,25			ERASE 9684
6678 0A,2C,05		P-CAT	CLASS 10, ",", " , CLASS 5
C8,25			CAT 9672
6683 05		P-ON ERR	CLASS 5
D1,20			ON ERR 8320
6686 05		P-STICK	CLASS 5
80,20			STICK 8401

6689 05	P-RESET	CLASS 5
54,24		RESET 9300
6692 05	P-SOUND	CLASS 5
28,21		SOUND 8488

REQUIREMENTS OF CLASSES

CLASS 0	NO FURTHER OPERANDS
CLASS 1	VARIABLE REQUIRED
CLASS 2	EXPRESSION REQUIRED, NUMERIC OR STRING
CLASS 3	NUMERIC MAY FOLLOW, USE 0 IF NOT
CLASS 4	SINGLE CHAR VARIABLE MUST FOLLOW
CLASS 5	SET OF ITEMS MAY BE GIVEN
CLASS 6	NUMERIC MUST FOLLOW
CLASS 7	COLOR ITEMS (ON/OFF ONLY)
CLASS 8	2 NUMERIC ITEMS SEPARATED BY COMMA MUST FOLLOW
CLASS 9	AS CLASS 8 BUT COLOR ITEMS MAY PRECEDE
CLASS 10	STRING NECESSARY
CLASS 11	CASSETTE ROUTINES

MAIN PARSER OF BASIC INTERPRETER

6695 FD,CB,01,BE SYNTAX LINE	RESET 7, (IY+1) INTERPRET OFF
6699 CD,68,17	CALL 5992 EDIT LINE #
6702 78	LD A, B
6703 B1	OR C BC= 0?
6704 28,08	JR Z, 8 (6714) SKIP CART CHECK
6706 3A,C6,5C	LD A, (23750) CART FLAGS
6709 CB,7F	BIT 7, A CARTRIDGE PRESENT?
6711 C2,ED,1B	JP NZ, 7149 SYN ERR
6714 AF	XOR A CLEAR A & CARRY
6715 32,47,5C	LD (23623), A SUB PPC = 0
6718 3D	DEC A
6719 32,47,5C	LD (23610), A RESET ERR #
6722 18,01	JR 1 (6725) STATMENT LOOP-1

STATEMENT LOOP

6724 E7	STATEMENT LOOP	RST 32 NEXT CHAR
6725 CD,4E,13	STATEMENT LOOP-1	CALL 4924 SET WORK
6728 FD,34,0D		INC (IY+13) SUB PPC
6731 FD,ED,1B		JP N, 7149 SYN ERR
6734 DF		RST 24 GET CHAR
6735 06,00		LD B, 0
6737 FE,0D		CP 13 ENTER?
6739 CA,09,1B		JP Z, 6921 LINE END
6742 FE,3A		CP 58 :?
6744 28,EA		JR Z, 234 (6724) STATEMENT LOOP
6746 21,B9,18		LD HL, 6841 END STATEMENT
6749 E5		PUSH HL A RETURN
6750 4F		LD C, A SAVE CHAR TO C
6751 E7		RST 32 GET CHAR
6752 79		LD A, C
6753 FE,0C		CP 12 DELETE?
6755 28,1A		JR Z, 26 (6783) CHAR 12+123-127
6757 FE,7B		CP 123 ON ERR?
6759 38,08		JR C, 8 (6769) GET TOKEN OFFSET
6761 FE,80		CP 128 GRAPHIC?

```

6763 30,04
6765 CB,47
6767 20,0E
6769 D6,CE      GET TOKEN OFFSET
6771 DA,ED,1B
6774 47
6775 21,45,19
6778 09      FIND OFFSET ADDR
6779 4E
6780 09
6781 18,19
6783 FE,0C      CHAR 12+123-127
6785 20,04
6787 3E,00
6789 18,08
6791 D6,7A
6793 FE,05
6795 20,02
6797 3E,02
6799 21,77,19      2ND OFFSET
6802 4F
6803 18,E5
6805 2A,74,5C      UPDATE T(SCAN LOOP)
6808 7E      GET PARAM
6809 23
6810 22,74,5C
6813 01,95,1A
6816 C5
6817 4F
6818 FE,20
6820 30,0C
6822 21,64,1B
6825 06,00
6827 09
6828 4E
6829 09
6830 E5
6831 DF
6832 05
6833 C9

JR NC, 4 (6769) GET TOKEN OFFSET
BIT 0, A CHAR >= 128?
JR NZ, 14 (6783) CHAR 12+13-127
SUB 206
JP C, 7149 SYN ERR (NOT TOKEN)
LD C, A GET CHAR
LD HL, 6469 SYN OFFSET TABLE
ADD HL, BC
LD C, (HL)
ADD HL, BC
JR 25 (6805) UPDATE T(SCAN LOOP)
CP 12 DELETE?
JR NZ, 4 (6791) CHAR 123-127
LD A, 0
JR 8 (6799) 2ND OFFSET
SUB 122
CP 5      RESET?
JR NZ, 2 (6799) 2ND OFFSET
LD A, 2
LD HL, 6519 2ND OFFSET TABLE
LD C, A
JR 229 (6778) FIND OFFSET ADDR
LD HL, (23668) T ADDR
LD A, (HL)
INC HL
LD (23668), HL T ADDR
LD BC, 6805 UPDATE T
PUSH BC A RETURN
LD C, A
CP 32 SPACE?
JR NC, 12 (6834) SEPARATOR
LD HL, 7012 TEM 1 CLASS TABLE
LD B, 0
ADD HL, BC
LD C, (HL)
ADD HL, BC
PUSH HL SAVE ADDR
RST 24 GET CHAR
DEC B
RET

```

SEPARATOR SUBROUTINE

```

6834 DF
6835 B9
6836 C2,ED,18
6839 E7
6840 C9

RST 24 GET CHAR
CP C CHAR FROM PARAMETER TABLE
JP NZ, 7149 SYN ERR
RST 32 NEXT CHAR
RET

```

STATEMENT RETURN SUBROUTINE

```

6841 CD,09,20      END STATEMENT
6844 38,02
6846 CF      ERR L
6847 14
6848 FD,CB,0A,7E      SKIP ERR
6852 C2,4A,1B

CALL 8201 BREAK?
JR C, 2 (6848) SKIP ERR
RST 8 ERROR
L BREAK in program
BIT 7, (IY+10) JUMP?
JP NZ, 6986 END TEM

```

6855 2A,42,5C
 6858 CB,7C
 6860 20,0A
 6862 3A,C6,5C
 6865 CB,7C
 6867 C2,EA,17
 6870 18,14

LD HL, (23618) NEW PFC
 BIT 7, H ANOTHER EDIT STATEMENT?
 JRNZ, 10 (6872) EXECUTE
 LD A, (23750) CART FLAGS
 BIT 7, A CART PRESENT?
 JP NZ, 6122 AROS LINE
 JR 20 (6882) LINE NEW

LINE RUN ENTRY POINT

6872 21,FE,FF EXECUTE (LINE RUN) LD HL, 65534 = -2
 6875 22,45,5C LD (23621), HL PFC = -2
 6878 2A,61,5C LD HL, (23649) WORK SPACE
 6881 2B DEC HL

LINE NEW SUBROUTINE

6882 ED,CB,59,5C LINE NEW LD DE, (23641) E LINE ADDR
 6886 1B DEC DE
 6887 3A,44,5C LD A, (23620) NS PFC
 6890 18,3B JR 59 (6951) NEXT LINE
 6892 CD,D6,16 CALL 5846 FIND LINE ADDR
 6895 3A,44,5C LD A, (23620) NS PFC
 6898 28,21 JR Z, 33 (6933) LINE USE
 6900 A7 AND A CLEAR FLAGS
 6901 20,4B JR NZ, 45 (6948) SET NEXT LINE
 6903 47 LD B, A CHECK PROG END
 6904 7E LD A, (HL)
 6905 E6,C0 AND 192 SAVE BITS 6 & 7
 6907 78 LD A, B
 6908 28,17 JR Z, 23 (6933) LINE USE
 6910 CF RST 8 ERROR
 6911 FF O OK

REM COMMAND ROUTINE

6912 C1 REM POP BC DROP STATEMENT RET
 6913 3A,C6,5C LD A, (23750) CART FLAGS
 6916 CB,7F BIT 7, A CART PRESENT?
 6918 C2,FF,17 JP NZ, 6143 AROS NEXT

LINE END ROUTINE

6921 CD,89,28 LINE END CALL 10377 INTERPRET?
 6924 C8 RET Z
 6925 2A,55,5C LD HL, (23637) NEXT LINE
 6928 3E,C0 LD A, 192 SET BITS 6 & 7
 6930 A6 AND (HL)
 6931 C0 RET NZ
 6932 AF XOR A CLEAR A & CARRY

LINE USE ROUTINE

6933 FE,01 LINE USE CP 1
 6935 CE,00 ADC A, 0
 6937 56 LD D, (HL) LINE # TO DE
 6938 23 INC HL
 6939 5E LD E, (HL)
 6940 ED,53,45,5C LD (23621), DE PFC
 6944 23 INC HL

6945 SE		LD E, (HL)	LINE LEN TO DE
6946 23		INC HL	
6947 56		LD D, (HL)	
6948 EB	SET NEXT LINE ADDR	EX DE, HL	
6949 19		ADD HL, DE	
6950 23		INC HL	

NEXT LINE ROUTINE

6951 22,55,5C	NEXT LINE	LD (23645), HL	NEXT LINE
6954 EB		EX DE, HL	
6955 22,5D,5C		LD (23645), HL	CHAR ADDR
6958 57		LD D, A	
6959 1E,00		LD E, 0	
6961 FD,36,0A,FF		LD (IY+10), 255	NS PPC
6965 15		DEC D	
6966 FD,72,0D		LD (IY+13), D	SUB PPC
6969 CA,44,1A		JP Z, 6724	STATEMENT LOOP
6972 14		INC D	
6973 CD,F3,16		CALL 5875	SUB LINE 1
6976 28,08		JR Z, 8 (6986)	END TEM
6978 CF	ERR M	RST 8	ERROR
6979 16		M	RAMTOP no good

CHECK END ROUTINE

6980 CD,89,28	END?	CALL 10377	INTERPRET?
6983 C0		RET Z	
6984 C1		POP BC	DISCARD SCAN LOOP
6985 C1		POP BC	DISCARD STATEMENT RET

NEXT STATEMENT ROUTINE

6986 DF	END TEM	RST 24	GET CHAR
6987 FE,0D		CP 13	ENTER?
6989 20,0D		JR NZ, 13 (7004)	SUB LINE?
6991 2A,55,5C		LD HL, (23637)	NEXT LINE
6994 3A,C6,5C		LD A, (23750)	CART FLAGS
6997 CB,7F		BIT 7, A	CART PRESENT?
6999 C2,FF,17		JP NZ, 6143	AROS NEXT
7002 18,AD		JR 173 (6921)	LINE END
7004 FE,3A	SUB LINE?	CP 58	:?
7006 CA,44,1A		JP Z, 6724	STATEMENT LOOP
7009 C3,ED,1B		JP 7149	SYN ERR

COMMAND CLASS TABLE

7012 0F	TEM 1	CLASS 0	7027	
7013 1D		CLASS 1	7042	
7014 4B		CLASS 2	7089	
7015 D9		CLASS 3	7232	
7016 67		CLASS 4	7119	
7017 0B		CLASS 5	7028	
7018 7B		CLASS 6	7141	OPT #
7019 8E		CLASS 7	7161	
7020 71		CLASS 8	7133	
7021 BC		CLASS 9	7209	
7022 81		CLASS 10	7151	TEM10
7023 D7		CLASS 11	7238	

SEE COMMENTS
FOLLOWING 6694
GIVING THE RE-
QUIREMENTS OF
EACH CLASS

COMMAND CLASSES 0, 3 & 5

7024 CD,49,1C CLASS 3
 7027 BF CLASS 0
 7028 C1 CLASS 5
 7029 CC,44,1B
 7032 EB

CALL 7241 CLASS 6
 CP A SET ZERO FLAG
 POP BC
 CALL Z, 6980 END?
 EX DE, HL

JUMP ENTER (C R) ROUTINE

7033 2A,74,5C JUMP ENTER
 7036 4E
 7037 23
 7038 46
 7039 EB
 7040 C5 CLASS END
 7041 C9

LD HL, (23668) T ADDR
 LD C, (HL)
 INC HL
 LD B, (HL)
 EX DE, HL
 PUSH BC
 RET

COMMAND CLASSES 1, 2 & 4

7042 CD,70,2C CLASS 1 CALL 11276 FIND N (LOOK FOR VAR)

VARIABLE IN ASSIGNMENT SUBROUTINE

7045 FD,36,37,00 CLASS 4-2 LD (IY+55), 0 RESET FLAG X
 7049 30,08 JR NC, 8 (7059) SET STACK
 7051 FD,CB,37,CE SET 1, (IY+55) VAR NOT FOUND ON
 7055 20,18 JR NZ, 24 (7081) SET STRING LEN
 7057 CF ERR 2 RST 8 ERROR
 7058 01 2 VARIABLE NOT FOUND
 7059 CC,54,2D SET STK CALL Z, 11604 STK VAR
 7062 FD,CB,01,76 BIT 6, (IY+1) STRING?
 7066 20,0D JR NZ, 13 (7081) SET STRING LEN
 7068 AF XOR A CLEAR A & CARRY
 7069 CD,89,28 CALL 10377 INTERPRET?
 7072 C4,AF,2F CALL NZ, 12207 SET PARAMETERS
 7075 21,71,5C LD HL, 23665 AT FLAG X
 7078 B6 OR (HL)
 7079 77 LD (HL), A A TO FLAG X
 7080 EB EX DE, HL
 7081 ED,43,72,5C SET STR LEN LD (23666), BC STR LEN
 7085 22,4D,5C LD (23629), HL DEST
 7088 C9 RET
 7089 C1 CLASS 2 POP BC DROP SCAN LOOP
 7090 CD,B9,1B CALL 7097 FETCH A VALUE
 7093 CD,44,1B CALL 6980 END?
 7096 C9 RET

FETCH A VALUE SUBROUTINE

7097 3A,3B,5C FETCH A VALUE
 7100 F5 LT22
 7101 CD,54,28
 7104 F1
 7105 FD,56,01
 7108 AA
 7109 E6,40
 7111 20,24
 7113 CB,7A

LD A, (23611) FLAGS
 PUSH AF
 CALL 10324 EXPRESSION
 POP AF OLD FLAGS
 LD D, (IY+1) FLAGS
 XOR D COMPARE FLAGS
 AND 64 CHECK KEYHIT
 JR NZ, 26 (7149) ERR C
 BIT 7, D SYNTAX CHECK?


```

7115 C2,BD,2E      JF NZ, 11965 LET
7118 C9             RET
COMMAND CLASS 4 ROUTINE
7119 CD,70,2C      CLASS 4  CALL 11376 FIND A VAR
7122 F5            PUSH AF
7123 79            LD A, C
7124 F6,9F         OR 159 NEXT VAR?
7126 3C            INC A
7127 20,14         JR NZ, 20 (7149) ERR C
7129 F1            POP AF
7130 18,A9         JR 169 (7045) CLASS 4-2

```

```

EXPECT NUMERIC/STRING EXPRESSIONS SUBROUTINE
7132 E7 DYADIC EXPECT EXPRESSION RST 32 NEXT CHAR
7133 CD,E5,1B      CLASS 8  CALL 7141 TEM 6
7136 FE,2C         CP 44 ", "?"
7138 20,09         JR NZ, 9 (7149) ERR C
7140 E7            RST 32 NEXT CHAR
7141 CD,54,28 TEM 6 (EXPECT #) CALL 10324 EXPRESSION
7144 FD,CB,01,76   BIT 6, (IY+1) STRING?
7148 C0            RET NZ
7149 CF            SYN ERR   RST 8 ERROR
7150 0B            C Nonsense in BASIC
7151 CD,54,28      CLASS 10  CALL 10324 EXPRESSION
7154 FD,CB,01,76   BIT 6, (IY+1) NUMBER?
7158 C8            RET Z
7159 18,F4         JR 244 (7149) ERR C

```

```

SET PERMANENT COLORS SUBROUTINE
7161 FD,CB,01,7E   CLASS 7  BIT 7, (IY+1) NEED INTERPRET?
7165 FD,CB,02,86   RES 0, (IY+2) UPPER SCREEN
7169 C4,88,08      CALL NZ, 2184 R ATTR
7172 F1            POP AF
7173 3A,74,5C      LD A, (23668) T ADDR
7176 2A,74,5C      LD HL, (23668)
7179 11,14,19      LD DE, 6420
7182 A7            AND A CLEAR FLAGS
7183 ED,52          SBC HL, DE
7185 7D            LD A, L
7186 CD,A6,23       CALL 9126 CHANGE TO CONTROL
7189 CD,44,1B       CALL 6980 END?
7192 2A,8F,5C      LD HL, (23693) ATTR T/MASK T
7195 22,8D,5C      LD (23693), HL ATTR P/MASK P
7198 21,91,5C      LD HL, 23697 AT P FLAG
7201 7E            LD A, (HL)
7202 07            RLC A X2
7203 AE            XOR (HL) P FLAG
7204 E6,AA          AND 170 SAVE ONLY EVEN BITS
7206 AE            XOR (HL)
7207 77            LD (HL), A RETURN P FLAG
7208 C9            RET

```

```

COMMAND CLASS 9 ROUTINE (PLOT, DRAW & CIRCLE)
7209 CD,89,28      CLASS 9  CALL 10377 INTERPRET?
7212 28,13         JR Z, 19 (7233) SKIP SETUP

```

7214	FD, CB, 02, 86		RES 0, (IY+2) UPPER SCREEN
7218	CD, 88, 08		CALL 2184 R ATTR
7221	21, 90, 5C		LD HL, 23696 AT MASK T
7224	7E		LD A, (HL)
7225	F6, F8		OR 248 SET 5 HIGH BITS
7227	77		LD (HL), A
7228	FD, CB, 56, B6		RES 6, (IY+87) T PAPER
7232	DF	CLASS 3	RST 24 GET CHAR
7233	CD, 8C, 23	SKIP SETUP	CALL 9100 GR COL
7236	18, 97		JR 151 (7133) CLASS 8 (EXPECT 2#)

COMMAND CLASS 12 ROUTINE (CASSETTE ROUTINES)

7238	C3, D2, 24	CLASS 11	JF 9426 NEW DEV
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FETCH A NUMBER SUBROUTINE

7241	FE, 0D	CLASS 6 (OPT #)	CP 13 ENTER?
7243	28, 04		JR Z, 4 (7249) USE 0
7245	FE, 3A		CP 58 :?
7247	20, 94		JR NZ, 148 (7141) TEM 6 EXPECT #)
7249	CD, 89, 28	USE 0	CALL 10377 INTERPRET?
7252	C8		RET Z
7253	EF		RST 40 FP CALC
7254	A0		STK 0
7255	38		END FP
7256	C9		RET

STOP COMMAND ROUTINE

7257	CF	STOP	RST 8 ERROR
7258	08		9 STOP statement

IF COMMAND ROUTINE

7259	C1	IF	POP BC
7260	CD, 89, 28		CALL 10377 INTERPRET?
7263	28, 14		JR Z, 20 (7285) GOTO STATEM LOOP
7265	EF		RST 40 FP CALC
7266	02		DELETE
7267	38		END FP
7268	EB		EX DE, HL
7269	CD, 04, 39		CALL 14596 TEST 0
7272	30, 0B		JR NC, 11 (7285) GOTO STATEM LOOP
7274	3A, C6, 5C		LD A, (23750) CART FLAGS
7277	CB, 7F		BIT 7, A CART PRESENT?
7279	C2, FF, 17		JP NZ, 6143 AROS NEXT
7282	C3, 09, 1B		JP 6921 LINE END
7285	C3, 45, 1A GOTO STATEM LOOP		JP 6725 STATEMENT LOOP-1

FOR COMMAND ROUTINE

7288	FE, CD	FOR	CP 205 STEP?
7290	20, 09		JR NZ, 9 (7301) USE 1
7292	E7		RST 32 NEXT CHAR
7293	CD, E5, 1B		CALL 7141 TEM 6
7296	CD, 44, 1B		CALL 6980 END?
7299	18, 06		JR 6 (7307) REORDER
7301	CD, 44, 1B	USE 1	CALL 6980 END?
7304	EF		RST 40 FP CALC

7305 A1		STK 1
7306 38		END FP
7307 EF	REORDER	RST 40 FP CALC
7308 C0		STK TO MEM 0
7309 02		DELETE
7310 01		EXCHANGE
7311 E0		GET MEM 0
7312 01		EXCHANGE
7313 38		END FP
7314 CD, BD, 2E		CALL 11965 LET
7317 22, 68, 5C		LD (23656), HL MEM
7320 2B		DEC HL SINGLE CHAR VAR NAME
7321 7E		LD A, (HL)
7322 CB, FE		SET 7, (HL) TURN INTO "FOR" VAR
7324 01, 06, 00		LD BC, 6 NEEDS 6 EXTRA SPACES
7327 09		ADD HL, BC
7328 07		RLC A
7329 38, 06		JR C, 6 (7337) LIMIT & STEP
7331 0E, 0D		LD C, 13 NEW "FOR" NEEDS 13 SPC
7333 CD, BB, 12		CALL 4795 INSERT BC SPACES
7336 23		INC HL
7337 E5	LIMIT & STEP	PUSH HL
7338 EF		RST 40 FP CALC
7339 02		DELETE
7340 02		DELETE
7341 38		END FP
7342 E1		POP HL
7343 EB		EX DE, HL
7344 0E, 0A		LD C, 10 REMOVE 10 BYTES
7346 ED, B0		LDIR
7348 2A, 45, 5C		LD HL, (23621) PPC
7351 EB		EX DE, HL
7352 73		LD (HL), E ADD LINE # TO VAR
7353 23		INC HL
7354 72		LD (HL), D
7355 FD, 56, 0D		LD D, (IY+13) SUB PPC
7358 14		INC D ADD SUB LINE # TO VAR
7359 23		INC HL
7360 72		LD (HL), D
7361 CD, 84, 1D	CK NEXT	CALL 7556 NEXT LOOP
7364 D0		RET NC
7365 2A, 45, 5C		LD HL, (23621) PPC
7368 22, 42, 5C		LD (23618), HL TO NEW PPC
7371 3A, 47, 5C		LD A, (23623) SUB PPC
7374 ED, 44		NEG
7376 57		LD D, A
7377 2A, BC, 5C		LD H, (23740) SYS CON ADDR
7380 23		INC HL
7381 7E		LD A, (HL)
7382 FE, 02		CP 2 CHAN 2?
7384 20, 18		NR NZ, 24 (7410) CET CHAR ADDR
7386 23		INC HL
7387 23		INC HL
7388 23		INC HL
7389 7E		LD A, (HL)

7390 E6,0F		AND 15	SAVE LOW NIBBLE
7392 4F		LD C, A	
7393 06,00		LD B, 0	BANK # 0
7395 CD,99,64		CALL 25753	BANK ENABLE
7398 ED,4B,45,5C		LD BC, (23621)	PPC
7402 CD,CF,17		CALL 6095	GET AROS LINE
7405 60		LD H, B	
7406 69		LD L, C	
7407 2B		DEC HL	
7408 18,03		JR 3 (7413)	FIND NEXT
7410 2A,5D,5C	GET CHAR ADDR	LD HL, (23625)	E PPC
7413 1E,1F	FIND NEXT	LD E, 243	NEXT
7415 ED,4B,55,5C	FIND NEXT LOOP	LD BC, (23637)	NEXT LINE
7419 CD,28,1D		CALL 7464	SKIP
7422 ED,43,55,5C		LD (23637), BC	NEXT LINE
7426 FD,46,38		LD B, (1Y+56)	MEM
7429 38,1F		JR C, 31 (7462)	ERR C
7431 E7		RST 32	NEXT CHAR
7432 F6,20		OR 32	MAKE A CAP LETTER
7434 B8		CP B	RIGHT NEXT?
7435 28,03		JR Z, 3 (7440)	NEXT FOUND
7437 E7		RST 32	NEXT CHAR
7438 18,E7		JR 231 (7415)	FIND NEXT LOOP
7440 E7	NEXT FOUND	RST 32	NEXT CHAR
7441 3E,01		LD A, 1	
7443 92		SUB D	
7444 32,44,5C		LD (23620), A	NS PPC
7447 21,26,5C		LD HL, 23740	AT SYS CON
7450 6E		LD L, (HL)	
7451 CB,7D		BIT 7, L	CART PRESENT?
7453 28,06		JR Z, 6 (7461)	RETURN
7455 01,00,FF		LD BC, B=255	BANK #
7458 CD,99,64		CALL 25753	BANK ENABLE
7461 C9	RETURN	RET	
7462 CF	ERR C	RST 8	ERROR
7463 0B		C	Nonsense in BASIC
LOOK IN PROGRAM SUBROUTINE (TO FIND DATA, DEF FN, OR NEXT)			
7464 7E	SKIP	LD A, (HL)	
7465 FE,3A		CP 58 :?	
7467 28,20		JR Z, 32 (7501)	MORE STATEMENTS
7469 23	LOOK PROG LOOP	INC HL	
7470 7E		LD A, (HL)	
7471 E6,C0		AND 192	SAVE BITS 6 & 7
7473 37		SCF	
7474 C0		RET NZ	
7475 7B		LD A, E	
7476 FE,E4		CP 228	DATA?
7478 20,03		JR NZ, 3 (7483)	SKIP AROS DATA
7480 22,C7,5C	AROS DATA	LD (23751), HL	AROS DATA ADDR
7483 46	SKIP AROS DATA	LD B, (HL)	
7484 23		INC HL	
7485 4E		LD C, (HL)	
7486 ED,43,42,5C		LD (23618), BC	NEW PPC
7490 23		INC HL	LENGTH TO BC

7491 4E		LD C, (HL)
7492 23		INC HL
7493 46		LD D, (HL)
7494 E5		PUSH HL
7495 09		ADD HL, BC HL AT NEXT LINE
7496 44		LD B, H XFER TO BC
7497 4D		LD C, L
7498 E1		POP HL
7499 16,00		LD D, 0
7501 C5	MORE STATEMENTS	PUSH BC
7502 CD,F3,16		CALL 5875 SUB LINE 1
7505 C1		POP BC
7506 D0		RET NC
7507 18,D8		JR 216 (7469) LOOK PROG LOOP

NEXT COMMAND ROUTINE

7509 FD,CB,37,4E	NEXT	BIT 1, (IY+55) VAR FOUND?
7513 C2,91,1B		JP NZ, 7057 ERR 2
7516 2A,4D,5C		LD HL, (23629) DEST ADDR
7519 CB,1F		BIT 7, (HL) A "FOR" VAR?
7521 28,1F		JR Z, 31 (7554) ERR 1
7523 23		INC HL
7524 22,68,5C		LD (23656), HL MEM
7527 EF		RST 40 FP CALC
7528 E0		GET MEM 0
7529 E2		GET MEM 2
7530 0F		ADD
7531 C0		STK MEM 0
7532 02		DELETE
7533 38		END FP
7534 CD,84,1D		CALL 7556 NEXT LOOP
7537 D8		RET C
7538 2A,68,5C		LD HL, (23656) MEM
7541 11,0F,00		LD DE, 15
7544 19		ADD HL, DE AT MEM 2
7545 5E		LD E, (HL)
7546 23		INC HL
7547 56		LD D, (HL)
7548 23		INC HL
7549 66		LD H, (HL)
7550 EB		EX DE, HL
7551 CB,FD,1E		JP 7933 GO TO-2
7554 CF	ERR 1	RST 8 ERROR
7555 00		1 NEXT without FOR

NEXT LOOP SUBROUTINE

7556 EF	NEXT LOOP	RST 40 FP CALC
7557 E1		GET MEM 1
7558 E0		GET MEM 0
7559 E2		GET MEM 2 STEP
7560 36		TEST <0
7561 00,02		JP IF TRUE, 2 (7564) LIMIT V
7563 01		EXCHANGE
7564 03	LIMIT V	SUBTRACT
7565 37		TEST >0

7566 00,04		JUMP IF TRUE, 4 (6571) IMPOSSIBLE
7568 38		END FP
7569 A7		AND A CLEAR FLAGS
7570 C9		RET
7571 38	IMPOSSIBLE	END FP
7572 37		SCF
7573 C9		RET
READ COMMAND ROUTINE		
7574 E7	READ NEXT VAR	RST 32 NEXT CHAR
7575 CD,82,1B	READ	CALL 7042 TEM 1
7578 CD,89,28		CALL 10377 INTERPRET?
7581 CA,78,1E		JP Z, 7800 READ VAR CHAR
7584 DF		RST 24 GET CHAR
7585 22,5F,5C		LD (23647), HL X POINTER (SAVE
7588 21,C6,5C	CK CART	LD HL, 23750 AT AROS FLAGS) DATA
7591 6E		LD L, (HL) POSN)
7592 CB,7D		BIT 7, L CART PRESENT?
7594 CA,52,1E		JP Z, 7762 DO NORMAL READ
7597 2A,BC,5C	GET CART DATA	LD HL, (23740) SYS CONF ADDR
7600 11,04,00		LD DE, 4
7603 19		ADD HL, DE
7604 7E		LD A, (HL)
7605 E6,0F		AND 15 SAVE LOW NIBBLE
7607 06,00		LD B, 0 BANK #
7609 4F		LD C, A
7610 CD,99,64		CALL 25753 BANK ENABLE
7613 2A,57,5C		LD HL, (23639) DATA ADDR
7616 7E	READ CART DATA	LD A, (HL)
7617 FE,2C		CP 44 ", "?
7619 28,13		JR Z, 19 (7640) UPDATE CART DATA
7621 1E,E4		LD E, 228 DATA FIND NEXT DATA
7623 CD,28,1D		CALL 7464 SKIP LINE
7626 30,09		JR NC, 9 (7637) NEXT DATA LINE
7628 01,00,FF	RETURN HOME	LD B, 255 BANK #
7631 CD,99,64		CALL 25753 BANK ENABLE
7634 C3,62,1E		JP 7778 ERR E
7637 22,57,5C	NEW DATA ADDR	LD (23639), HL DATA ADDR
7640 2A,C7,5C	UPDATE CART DATA	LD HL, (23751) CART CUR DATA ADDR
7643 23		INC HL SKIP LINE #
7644 23		INC HL
7645 4E		LD C, (HL) LENGTH TO BC
7646 23		INC HL
7647 46		LD B, (HL)
7648 ED,43,C9,5C		LD (23753), BC UPD CART DATA LEN
7652 01,00,FF		LD BC, B=255 BANK #
7655 CD,99,64		CALL 25753 BANK ENABLE
7658 ED,4B,C9,5C		LD BC, (23753) LEN CUR DATA LINE
7662 2A,4F,5C		LD HL, (23631) CHANS
7665 E5		PUSH HL SAVE CHAN
7666 2B		DEC HL
7667 CD,BB,12		CALL 4795 INSERT BC SPACES
7670 D1		POP DE
7671 21,FF,00		LD HL, 255
7674 E5		PUSH HL

7675 2A,C7,5C	LD HL, (23751)CART CUR DATA LINE
7678 23	INC HL SKIP LINE #
7679 23	INC HL
7680 23	INC HL SKIP LINE LENGTH
7681 23	INC HL
7682 E5	PUSH HL SETUP XFER BYTES
7683 D5	PUSH DE
7684 ED,4B,C9,5C	LD BC, (23753) CART DATA LINE LEN
7688 C5	PUSH BC
7689 01,01,00	LD BC, 1
7692 C5	PUSH BC
7693 CD,22,67	CALL 26402 XFER BYTES
7696 2A,C7,5C	LD HL, (23751) CART CUR DATA LINE
7699 ED,5B,C9,5C	LD DE, (23753) CART DATA LINE LEN
7703 19	ADD HL, DE HL=NEXT LINE ADDR
7704 11,04,00	LD DE, 4
7707 19	ADD HL, DE TO TOKEN
7708 ED,4B,57,5C	LD BC, (23639) DATA ADDR
7712 A7	AND A CLEAR FLAGS
7713 ED,42	SBC HL, BC
7715 44	LD B, H
7716 4D	LD C, L
7717 2A,4F,5C	LD HL, (23631) CHANS
7720 A7	AND A CLEAR FLAGS
7721 ED,42	SBC HL, BC
7723 E5	PUSH HL
7724 23	INC HL
7725 22,5D,5C	LD (23645), HL CH ADDR
7728 CD,B9,1B	CALL 7097 FETCH A VALUE
7731 D1	POP DE
7732 2A,5D,5C	LD HL, (23645) CHAR ADDR
7735 A7	AND A CLEAR FLAGS
7736 ED,52	SBC HL, DE
7738 ED,5B,57,5C	LD DE, (23639) UPD DATA ADDR
7742 19	ADD HL, DE
7743 22,57,5C	LD (23639), HL DATA ADDR
7746 2A,4F,5C	LD HL, (23631) CHANS
7749 ED,4B,C9,5C	LD BC, (23753) CUR DATA LINE LEN
7753 A7	AND A CLEAR FLAGS
7754 ED,42	SBC HL, DE
7756 CD,50,17	CALL 5968 DEL REC (RECLAIM-2)
7759 C3,6E,1E	JP 7790 READ DATA ADDR
7762 2A,57,5C DO NORMAL READ	LD HL, (23639) DATA ADDR
7765 7E	LD A, (HL)
7766 FE,2C	CP 44 ", "?"
7768 CA,64,1E	JP Z, 7780 NEXT READ
7771 1E,E4 NEED NEW DATA LINE	LD E, 228 DATA
7773 CD,28,1D	CALL 7464 SKIP (FIND NEXT DATA LN
7776 30,02	JR NC, 2 (7780) NEXT READ
7778 CF	RST 8 ERROR
7779 0D	E Out of DATA
7780 CD,77,00 NEXT READ	CALL 119 INC CHAR ADDR
7783 CD,B9,1B	CALL 7097 FETCH A VALUE
7786 DF	RST 24 GET CHAR
7787 22,57,5C	LD (23639), HL DATA ADDR

```

7790 2A,5F,5C READ DATA ADDR      LD HL, (23647) X POINTER
7793 FD,36,26,00                    LD (IY+48), 0 RESET FLAG X
7797 CD,78,00                        CALL 120 SAVE CHAR ADDR
7800 DF          READ VAR CHAR      RST 24 GET CHAR
7801 FE,2C                          CP 44 ", "?
7803 CA,96,1D                        JP Z, 7574 READ NEXT READ VAR
7806 CD,44,1B                        CALL 6980 END?
7809 C9                              RET

```

DATA COMMAND ROUTINE

```

7810 CD,89,28          DATA      CALL 10377 INTERPRET?
7813 20,0B              JR NZ, 11 (7826) LOOK FOR LINE
7815 CD,54,28  LOOK FOR ", "    CALL 10324 EXPRESSION?
7818 FE,2C              CP 44 ", "?
7820 C4,44,1B          CALL NZ, 6980 END?
7823 E7                RST 32 NEXT CHAR
7824 18,F5              JR 245 (7815) DATA LOOP
7826 3E,E4  LOOK FOR LINE      LD A, 228 DATA

```

PASSBY SUBROUTINE (FOR DATA AND DEF FN)

```

7828 4D          PASS BY      LD B, A  A HOLDS DATA OR DEF FN
7829 ED,B9              CPDR
7831 11,00,02          LD DE, 512
7834 C3,F3,16          JP 5875 FIND SUB LINE 1

```

RESTORE COMMAND ROUTINE

```

7837 CD,23,1F          RESTORE  CALL 7971 FIX-U (FIND INT)
7840 2A,BC,5C          LD HL, (23740) SYS CONF ADDR
7843 23                INC HL
7844 7E                LD A, (HL)
7845 FE,02              CP 2
7847 20,21              JR NZ, 33 (7882) RESTORE BC SPCS
7849 23          CART RESTORE  INC HL
7850 23                INC HL
7851 23                INC HL
7852 7E                LD A, (HL)
7853 E6,0F              AND 15  SAVE LOW NIBBLE
7855 C5                PUSH BC  SETUP BNK ENABLE
7856 4F                LD C, A
7857 06,00              LD B, 0
7859 CD,99,64          CALL 25753  BANK ENABLE
7862 C1                POP BC
7863 CD,CF,17          CALL 6095  GET ARDS LINE
7866 01,00,FF          LD B, 255  BANK #
7869 CD,99,64          CALL 25753  BANK ENABLE
7872 18,03              JR 3 (7877) SKIP FIND LINE ADDR
7874 CD,D6,16          CALL 5846  FIND LINE ADDR
7877 2B  SKIP FIND LINE ADDR  DEC HL
7878 22,57,5C          LD (23639), HL  DATA LINE
7881 C9                RET
7882 60  RESTORE BC SPACES  LD H, B
7883 69                LD L, C
7884 CD,D6,16          CALL 5846  FIND LINE ADDR
7887 2B                DEC HL
7888 22,57,5C          LD (23639), HL  DATA LINE ADDR

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7891 C9

RET

RANDOMIZE COMMAND ROUTINE

7892 CD,23,1F RAND
 7895 78
 7896 B1
 7897 20,04
 7899 ED,4B,78,5C
 7903 ED,43,76,5C
 7907 C9

CALL 7971 FIX-U (FIND INT)
 LD A, B
 OR C BC=0?
 JR NZ, 4 (7903) NEW SEED
 LD BC, (23672) FRAMES
 LD (23670), BC SEED
 RET

CONTINUE COMMAND ROUTINE

7908 2A,6E,5C CONT
 7911 24
 7912 CA,42,1B
 7915 25
 7916 FD,56,36
 7919 18,0C

LD HL, (23662) OLD PPC
 INC H
 JP Z, 6978 ERR H
 DEC H
 LD D, (1Y+84) HI BYTE STK END
 JR 12 (7933) GO TO-2

GO TO COMMAND ROUTINE

7921 CD,23,1F JUMP(GO TO)
 7924 60
 7925 69
 7926 16,00 GO TO-1
 7928 7C
 7929 FE,F0
 7931 30,2C
 7933 22,42,5C GO TO-2
 7936 FD,72,0A
 7939 C9

CALL 7971 FIX-U(FIND INT)
 LD H, B LINE # TO HL
 LD L, C
 LD D, 0
 LD A, H
 CP 240 LIST?
 JR NC, 44 (7977) ERR B
 LD (23618), HL NEW PPC
 LD (1Y+10), D NS PPC
 RET

OUT COMMAND ROUTINE

7940 CD,0F,1F OUT
 7943 ED,79
 7945 C9

CALL 7951 GET 2 PARAMETERS
 OUT (C), A
 RET

POKE COMMAND ROUTINE

7946 CD,0F,1F POKE
 7949 02
 7950 C9

CALL 7951 GET 2 PARAMETERS
 LD (BC), A
 RET

TWO PRAMETERS ROUTINE

7951 CD,93,31 GET 2 PARAMETERS
 7954 38,15
 7956 28,02
 7958 ED,44
 7960 F5 SAVE 1ST
 7961 CD,23,1F
 7964 F1
 7965 C9

CALL 12691 FP TO A
 JR C, 21 (7977) ERR B
 JR Z, 2 (7960) SAVE 1ST
 NEG
 PUSH AF
 CALL 7971 FIX-U (FIND INT)
 POP AF GET 1ST
 RET

FIND INTEGERS ROUTINES

7966 CD,93,31 FIX-U1 (SINGLE INT) CALL 12691 FP TO A
 7969 18,03 JR 3 (7974) FIND INT-1
 7971 CD,60,31 FIX-U (DOUBLE INT) CALL 12680 FP TO BC

7974 38,01	FIND -INT-1	JR C, 1 (7977) ERR B
7976 C8		RET Z
7977 CF	ERR B	RST 8 ERROR
7978 0A		B INT out of range
RUN COMMAND ROUTINE		
7979 CD,F1,1E	RUN	CALL 7921 JUMP (GO TO)
7982 01,00,00		LD BC, 0 DO A RESTORE 0
7985 CD,CA,1E		CALL 7882 RESTORE BC
7988 18,03		JR 3 (7993) CLEAR BC
CLEAR COMAND ROUTINE		
7990 CD,23,1F	CLEAR	CALL 7971 FIX-U1(FIND SINGLE INT)
7993 78 CLEAR-RUN	CLEAR BC	LD A, B
7994 B1		OR C BC =0?
7995 20,04		JR NZ, 4 (8001) SAVE VALUE
7997 ED,4B,B2,5C		LD BC, (23730) SEED
8001 C5		PUSH BC
8002 ED,5B,4B,5C		LD DE, (23627) VARS
8006 2A,59,5C		LD HL, (23641) E LINE
8009 2B		DEC HL
8010 CD,4D,17		CALL 5965 DEL DE (CLEAR VARS)
8013 CD,A6,08		CALL 2214 K-CLS
8016 21,C6,5C		LD HL, 23750 AT CART FLAGS
8019 6E		LD L, (HL)
8020 CB,7D		BIT 7, L CART PRESENT?
8022 28,0F		JR Z, 15 (8039) NORMAL CLEAR
8024 2A,BC,5C	CART CLEAR	LD HL, (23740) SYS CONF ADDR
8027 23		INC HL
8028 23		INC HL
8029 5E		LD E, (HL)
8030 23		INC HL
8031 56		LD D, (HL)
8032 EB		EX DE, HL
8033 2B		DEC HL
8034 22,57,5C		LD (23639), HL DATA ADDR
8037 18,07		JR 7 (8046) CONTINUE CLEAR
8039 2A,53,5C	NORMAL CLEAR	LD HL, (23635) PROGRAM
8042 2B		DEC HL
8043 22,57,5C		LD (23639), HL DATA ADDR
8046 2A,65,5C	CONTINUE CLEAR	LD HL, (23653) STK END
8049 11,32,00		LD DE 50
8052 19		ADD HL, DE
8053 D1		POP DE
8054 ED,52		SBC HL, DE
8056 30,08		JR NC, 8 (8068) ERR M
8058 2A,B4,5C		LD HL, (23732) P RAMTOP
8061 A7		AND A CLEAR FLAGS
8062 ED,52		SBC HL, DE
8064 30,02		JR NC, 2 (8068) SKIP ERR
8066 CF	ERR M	RST 8 ERROR
8067 15		M RAMTOP no good
8068 EB	SKIP ERROR	EX DE, HL
8069 22,B2,5C		LD (23730), HL RAMTOP
8072 D1		POP DE

8073 C1		POP BC
8074 2A,CO,5C		LD HL, (23744) MACH STK BOTTOM
8077 2B		DEC HL
8078 36,3E		LD (HL), 62 "?" GOSUB STK MARKER
8080 2B		DEC HL
8081 F9		LD SP, HL
8082 C5		PUSH BC
8083 ED,73,3D,5C		LD (23613), SP ERR SP
8087 EB		EX DE, HL
8088 E9		JP (HL)
GOSUB COMMAND ROUTINE		
8089 D1	GOSUB	POP DE
8090 FD,66,0D		LD H, (IY+13) SUB PPC
8093 24		INC H
8094 E3		EX (SP), HL SAVE STATEMENT RETURN
8095 33		INC SP
8096 ED,4B,45,5C		LD BC, (23621) PPC
8100 C5		PUSH BC SAVE LINE #
8101 E5		PUSH HL
8102 ED,73,3D,5C		LD (23613), SP SUB PPC
8106 D5		PUSH DE SAVE RETURN ADDR
8107 CD,F1,1E		CALL 7921 JUMP
8110 2A,CO,5C		LD HL, (23744) SYS CONF TABLE
8113 25		DEC H
8114 11,10,00		LD DE, 16
8117 19		ADD HL, DE
8118 ED,72		SBC HL, SP
8120 D8		RET C
8121 18,14		JR 20 (8143) ERR 4
TEST ROOM SUBROUTINE		
8123 2A,65,5C	CK Size	LD HL, (23653) STK END
8126 09		ADD HL, DE
8127 38,0E		JR C, 14 (8143) ERR 4
8129 EB		EX DE, HL
8130 21,50,00		LD HL, 80
8133 19		ADD HL, DE
8134 38,07		JR C, 7 (8143) ERR 4
8136 ED,5B,B2,5C		LD DE, (23730) RAMTOP
8140 ED,52		SBC HL, DE
8142 D8		RET C
8143 2E,03	ERR 4	LD L, 2 (4 Out of memory)
8145 C3,55,00		JP 85 ERR-3
RETURN COMMAND ROUTINE		
8148 C1	RETURN	POP BC GET STATEMENT RETURN
8149 E1		POP HL GET ERROR ADDR
8150 D1		POP DE LAST ENTRY ON STACK
8151 7A		LD A, D
8152 FE,3E		CP 62 "?" END MARKER?
8154 28,0B		JR Z, 11 (8167) ERR 7
8156 3B		DEC SP
8157 E3		EX (SP), HL
8158 EB		EX DE, HL

```

8159 ED,73,3D,5C      LD (23613), SP  ERR SP
8163 C5 -             PUSH BC
8164 C3,FD,1E         JP 7933  GO TO-2
8167 D5               ERR 7  PUSH DE  REPLACE END MARKER
8168 E5               PUSH HL  REPLACE ERROR ADDR
8169 CF               RST 8  ERROR
8170 06               7 RETURN without GOSUB

```

PAUSE COMMAND ROUTINE

```

8171 FD,CB,01,AE      PAUSE      RES 5, (IY+1) RESET KEYHIT
8175 CD,23,1F         CALL 7971  FIX-U (FIND INT)
8178 76               PAUSE AGAIN HALT (WAIT FOR MASKABLE INTERRUPT)
8179 0B               DEC BC
8180 78               LD A, B
8181 B1               OR C      BC= 0?
8182 28,0C            JR Z, 12 (8196) PAUSE END
8184 78               LD A, B
8185 A1               AND C
8186 3C               INC A
8187 20,01            JR NZ, 1 (8190) KEYHIT?
8189 03               INC BC
8190 FD,CB,01,6E      KEYHIT?    BIT 5, (IY+1) KEYHIT?
8194 28,EE            JR Z, 238 (8178) PAUSE AGAIN
8196 FD,CB,01,AE      PAUSE END  RES 5, (IY+1) KEYHIT OFF
8200 C9               RET

```

BREAK KEY SUBROUTINE

```

8201 3E,7F           BREAK?     LD A, 127 FORM PORT ADDR 7FFE
8203 DB,FE           IN A, (254)
8205 1F             RR A
8206 D8             RET C
8207 FD,CB,7D,76     BIT 6, (IY+125) HI BYTE ERR LINE
8211 28,02           JR Z, 2 (8215) NO BREAK
8213 37             SCF BREAK ON
8214 C9             RET
8215 3E,FE           NO BREAK    LD A, 254 FORM PORT ADDR FEFE
8217 DB,FE           IN A, (254) READ BYTE
8219 1F             RR A
8220 C9             RET

```

DEF FN COMMAND ROUTINE

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8221 CD,89,28        DEF FN     CALL 10377 INTERPRET?
8224 28,05           JR Z, 5 (8231) # ON
8226 3E,CE           LD A, 206 DEF FN
8228 C3,94,1E        JP 7828 PASS BY
8231 FD,CB,01,F6      # ON      SET 6, (IY+1) # ON
8235 CD,4B,30        CALL 12363 ALPHA?
8238 30,16           JR NC, 22 (8262) ERROR CK
8240 E7             RST 32 NEXT CHAR
8241 FE,24           CP 36 $?
8243 20,0F           JR NZ, 5 (8250) BRACKET?
8245 FD,CB,01,B6     STRING ON  RES 6, (IY+1) STRING ON
8249 E7             RST 32 NEXT CHAR
8250 FE,28           BRACKET?   CP 40 (?)
8252 20,3C           JR NZ, 60 (8314) SYN ERR CK

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8254 E7		RST 32 NEXT CHAR
8255 FE,29		CP 41)?
8257 28,20		JR Z, 32 (8291) SKIP RETURN
8259 CD,4B,30	CK ALPHA	CALL 12363 ALPHA?
8262 D2,ED,1B	ERROR CK	JF NC 7149 SYN ERR
8265 EB		EX DE, HL
8266 E7		RST 32 NEXT CHAR
8267 FE,24		CP 36 \$?
8269 20,02		JR NZ, 2 (8273) SKIP NAME END
8271 EB	GOTO NAME END	EX DE, HL
8272 E7		RST 32 NEXT CHAR
8273 EB	SKIP NAME END	EX DE, HL
8274 01,06,00		LD BC, 6 NEEDS 6 SPACES
8277 CD,BB,12		CALL 4795 INSERT BC SPACES
8280 23		INC HL INSERT SLUG
8281 23		INC HL
8282 36,0E		LD (HL), 14 SLUG
8284 FE,2C		CP 44, ", "?
8286 20,03		JR NZ, 3 (8291) SKIP RETURN
8288 E7		RST 32 NEXT CHAR
8289 18,E0		JR 224 (8259) CHECK ALPHA
8291 FE,29	SKIP RETURN	CP 41)?
8293 20,13		JR NZ, 19 (8314) SYN ERROR CK
8295 E7		RST 32 NEXT CHAR
8296 FE,3D		CP 61 =?
8298 20,0E		JR NZ, 14 (8314) SYN ERROR CK
8300 E7		RST 32 NEXT CHAR
8301 3A,3B,5C		LD A, (23611) FLAGS
8304 F5		PUSH AF SAVE FLAGS
8305 CD,54,28		CALL 10324 EXPRESSION
8308 F1		POP AF GET OLD FLAGS
8309 FD,AE,01		XOR (IY+1) FLAGS (COMPARE WITH
8312 E6,40		AND 64 # ON NEW)
8314 C2,ED,1B	SYN ERROR CK	JF NZ, 7149 SYN ERR
8317 CD,44,1B		CALL 6980 END?
ON ERR COMMAND ROUTINE		
8320 DF	ON ERR	RST 24 GET CHAR
8321 FE,7F		CP 127 RESET?
8323 28,29		JR Z, 41 (8366) ON ERR RESET
8325 FE,EC		CP 236 GOTO?
8327 28,33		JR Z, 51 (8380) ON ERR GOTO
8329 FE,E8		CP 232 CONTINUE?
8331 C2,ED,1B		JF NZ, 7149 SYN ERR
8334 E7	ON ERR CONT	RST 32 NEXT CHAR
8335 CD,44,1B		CALL 6980 END?
8338 FD,CB,7D,7E		BIT 7, (IY+125) HI BYTE ERR LINE
8342 C8		RET Z
8343 2A,B8,5C		LD HL, (23736) ERR LINE #
8346 22,42,5C		LD (23618), HL NEW PPC
8349 3A,BA,5C		LD A, (23738) HI BYTE NEXT LINE
8352 32,44,5C		LD (23620), A NS PPC
8355 FD,CB,7D,B6		RES 6, (IY+125) HI BYTE ERR LINE
8359 E1	MAKE 7 SPACES	POP HL
8360 11,07,00		LD DE, 7

8363 19
 8364 E5
 8365 C9
 8366 E7 ON ERR RESET
 8367 CD, 44, 1B
 8370 FD, CB, 7D, BE
 8374 FD, CB, 7D, B6
 8378 18, EB
 8380 E7 ON ERR GO TO
 8381 CD, E5, 1B
 8384 CD, 44, 1B
 8387 CD, 60, 31
 8390 78
 8391 E6, 3F
 8393 F6, 80
 8395 47
 8396 ED, 43, B6, 5C
 8400 C9

ADD HL, DE
 PUSH HL
 RET
 RST 32 NEXT CHAR
 CALL 6980 END?
 RES 7, (IY+125) HI BYTE ERR LINE
 RES 6, (IY+125)
 JR 235 (8359) MAKE 7 SPACES
 RST 32 NEXT CHAR
 CALL 7141 TEM 6 (EXPECT 1 #)
 CALL 6980 END?
 CALL 12640 FP TO BC
 LD A, B
 AND 63 SAVE 5 LOW BITS
 OR 128 SET BIT 7 (MAKE VARIABLE
 LD B, A
 LD (23734), BC ERR LINE
 RET

STICK COMMAND ROUTINE

8401 DF STICK
 8402 FE, 2C
 8404 20, 0A
 8406 CD, 89, 28
 8409 28, 0C
 8411 EF
 8412 A1
 8413 38
 8414 18, 07
 8416 CD, E5, 1B EXPECT #
 8419 FE, 2C
 8421 20, 35
 8423 E7 GET NEXT CHAR
 8424 FE, 0D
 8426 28, 09
 8428 FE, 3A
 8430 28, 04
 8432 CD, E5, 1B
 8435 18, 09
 8437 01, 0F, 27 DEFAULT USE 9999
 8440 CD, 89, 28
 8443 C4, E9, 30
 8446 CD, 44, 1B SKIP DEFAULT
 8449 CD, 1E, 21
 8452 23
 8453 CD, D6, 16
 8456 E5
 8457 CD, 1E, 21
 8460 CD, D6, 16
 8463 EB
 8464 E1
 8465 E5
 8466 37
 8467 ED, 52
 8469 38, 05

RST 23 GET CHAR
 CP 44 ", "?"
 JR NZ, 10 (8416) EXPECT #
 CALL 10377 INTERPRET?
 JR Z, 12 (8423) GET NEXT CHAR
 RST 40 FP CALC
 STK 1
 END FP
 JR 7 (8423) GET NEXT CHAR
 CALL 7141 TEM 6 (EXPECT 1 #)
 CP 44 ", "?"
 JR NZ, 53 (8476) ERR C
 RST 32 NEXT CHAR
 CP 13 ENTER?
 JR Z, 9 (8437) USE 9999
 CP 58 :?
 JR Z, 5 (8437) USE 9999
 CALL 7141 REM 6 (EXPECT 1 #)
 JR 9 (8446) SKIP DEFAULT
 LD BC, 9999
 CALL 10377 INTERPRET?
 CALL NZ, 12521 STK BC
 CALL 6980 END?
 CALL 8478 GET #
 INC HL
 CALL 5846 FIND LINE ADDR
 PUSH HL
 CALL 8478 GET #
 CALL 5846 FIND LINE ADDR
 EX DE, HL
 POP HL
 PUSH HL
 SCF
 SBC HL, DE
 JR C, 5 (8476) ERR C

8471 E1		POP HL
8472 CD, 4D, 17		CALL 5965 DEL DE (RECLAIM-1)
8475 C9		RET
8476 CF	ERR C	RST 8 ERROR
8477 DB		C Nonsense in BASIC
8478 CD, 60, 31	GET #	CALL 12640 FP TO BC
8481 78		LD A, B
8482 E6, 3F		AND 63 SAVE 5 LOW BITS
8484 67		LD H, A
8485 69		LD L, C
8486 C9		RET

SOUND CMMAND ROUTINE

8487 E7	READ NEXT SOUND CHAR	RST 32 NEXT CHAR
8488 CD, DD, 1B	SOUND	CALL 7133 CLASS 8 NUMERIC/STR EXP
8491 CD, 89, 28		CALL 10377 INTERPRET?
8494 28, 16		JR Z, 22 (8518) NEXT EXPRESSION?
8496 CD, 93, 31		CALL 12691 FP TO A
8499 F5		PUSH AF SAVE #
8500 CD, 93, 31		CALL 12691 FP TO A
8503 FE, 11		CP 17 (ONLY 16 REGISTERS)
8505 D2, ED, 1B		JF NC, 7149 SYN ERR (# TOO BIG)
8508 D3		DEC A TEST BIT 7
8509 3C		INC A
8510 FA, ED, 18		JF N, 7149 SYN ERR (# = 0)
8513 D3, F5		OUT (254), A
8515 F1		POP AF GET 1ST #
8516 D3, F6		OUT (246), A
8518 DF	NEXT EXPRESSION?	RST 24 GET CHAR
8519 FE, 3B		CP 59 ; ?
8521 28, DC		JR Z, 220 (8487) READ NEXT SOUND
8523 CD, 44, 1B		CALL 6980 END? CHAR
8526 C9		RET

UNSTACK Z SUBROUTINE

8527 CD, 89, 28	UNSTACK Z	CALL 10377 INTERPRET?
8530 E1		POP HL
8531 C8		RET Z
8532 E9		JP (HL)

LPRINT AND PRINT COMMAND ROUTINE

8533 3E, 03	LPRINT	LD A, 3 PREPARE TO OPEN CHAN P
8535 18, 0A		JR 10 (8547) SKIP CART/S
8537 3A, C6, 5C	PRINT	LD A, (23750) CART FLAGS
8540 CB, 87		RES 0, A USE TOP SCREEN
8542 32, C6, 5C		LD (23750), A RETURN FLAG
8545 3E, 02		LD A, 2 PREPARE TO OPEN CHAN S
8547 CD, 89, 28	SKIP CART/S	CALL 10377 INTERPRET?
8550 C4, 30, 12		CALL NZ, 4656 SELECT CHAN
8553 CD, 89, 28		CALL 10377 INTERPRET?
8556 C4, 79, 21		CALL NZ, 8569 SET TOKEN FLAG
8559 CD, 88, 08		CALL 2184 R ATTR TEMP
8562 CD, 7E, 21		CALL 8574 PRINT SEQUENCE
8565 CD, 44, 1B		CALL 6980 END?
8569 C9		RET

SET TOKEN FLAG SUBROUTINE

8569 FD,CB,01,E6 SET TOKEN
8573 C9

SET 4, (IY+1) TOKEN ON
RET

PRINT A SEQUENCE SUBROUTINE

8574 DF PRINT SEQUENCE
8575 CD,E4,21
8578 28,0D
8580 CD,ED,21 CONS PRINT CONTR
8583 28,FB
8585 CD,9B,21
8588 CD,ED,21
8591 28,F3
8593 FE,29 PRINT SEQ END
8595 C8

RST 23 GET CHAR
CALL 8676 STRING END?
JR Z, 13 (8593) PRINT SEQ END
CALL 8685 PRINT CONTROLS
JR Z, (8590) CONS PRINT CONTROLS
CALL 8603 PRINT ITEMS
CALL 8685 STRING END?
JR Z, 243 (8580) CONS PRINT CONTR
CP 41)?
RET Z TREAT AS ENTER

START A NEW LINE (PRINT C-R) SUBROUTINE

8596 CD,4F,21 PRINT C-R
8599 3E,0D
8601 D7
8602 C9

CALL 8527 UNSTACK Z
LD A, 13 ENTER
RST 16 PRINT CHAR
RET

PRINT ITEMS SUBROUTINE

8603 DF PRINT ITMES
8604 FE,AC
8606 20,0D
8608 CD,DC,1B DO AT
8611 CD,4F,21
8614 CD,60,26
8617 3E,16
8619 18,10
8621 FE,AD TRY TAB
8623 20,12
8625 E7 DO TAB
8626 CD,E5,1B
8629 CD,4F,21
8632 CD,23,1F
8635 3E,17
8637 D7 PRINT AT-TAB
8638 79
8639 D7
8640 78
8641 D7
8642 C9
8643 CD,9C,23 CK COLOR TOKEN
8646 D0
8647 CD,0F,22
8650 D0
8651 CD,54,28
8654 CD,4F,21
8657 FD,CB,01,76
8661 CC,AF,2F
8664 C2,A1,31
8667 78 PRINT STRING

RST 24 GET CHAR
CP 172 AT?
JR NZ, 13 (8621) TRY TAB
CALL 7132 DYADIC (NEXT 2 #'S)
CALL 8527 UNSTACK Z
CALL 9824 GET X,Y
LD A, 22 AT CONTROL
JR 16 (8637) PRINT AT-TAB
CP 173 TAB?
NR NZ, 18 (8643) CK COLOR CONTROL
RST 32 NEXT CHAR
CALL 7141 TEM 6 (EXPECT 1#)
CALL 8527 UNSTACK Z
CALL 7971 FIX-U (FIND INT)
LD A, 23 TAB CONTROL
RST 16 PRINT CHAR
LD A, C
RST 16 PRINT CHAR
LD A, B
RST 16 PRINT CHAR
RET
CALL 9116 CK COLOR TOKEN
RET NC
CALL 8719 STREAM ALTER?
RET NC
CALL 10324 EXPRESSION?
CALL 8527 UNSTACK Z
BIT 6, (IY+1) #?
CALL Z, 12207 GET STRING PARAM
JP NZ, 12705 OUTPUT #
LD A, B

8668 B1
 8669 0B
 8670 C8
 8671 1A
 8672 13
 8673 D7
 8674 18,F7

OR B BC=0?
 DEG BC
 RET C
 LD A, (DE)
 INC DE
 RST 16 PRINT CHAR
 JR 247 (8667) PRINT STRING

END OF PRINTING SUBROUTINE

8676 FE,29 PRINT END?
 8678 C8
 8679 FE,0D TERM?
 8681 C8
 8682 FE,3A
 8684 C9

CP 41)?
 RET Z
 CP 13 ENTER?
 RET Z
 CP 58 :?
 RET

PRINT POSITION SUBROUTINE

8685 DF PRINT SPACING
 8686 FE,3B
 8688 28,14
 8690 FE,2C
 8692 20,0A
 8694 CD,89,28
 8697 28,0B
 8699 3E,06
 8701 D7
 8702 18,06
 8704 FE,27 NEW LINE?
 8706 C0
 8707 CD,94,21
 8710 E7 GET NEXT CHAR
 8711 CD,E4,21
 8714 20,01
 8716 C1
 8717 BF NOT END
 8718 C9

RST 24 GET CHAR
 CP 59 ;?
 JR Z, 20 (8710) GET NEXT CHAR
 CP 44 ", "?
 JR NZ, 10 (8704) NEW LINE?
 CALL 10377 INTERPRET?
 JR Z, 11 (8710) GET NEXT CHAR
 LD A, 6 PRINT COMMA
 RST 16 PRINT CHAR
 JR 6 (8710) GET NEXT CHAR
 CP 39 ' ?
 RET NZ
 CALL 8596 START A NEW LINE
 RST 32 NEXT CHAR
 CALL 8676 STRING END?
 JR NZ, 1 (8717) NOT END
 POP BC
 CP A SET Z IF NOT END
 RET

ALTER STREAM SUBROUTINE

8719 FE,23 STRIT 0(ALTER STREAM?) CP 35 "#"?

8721 37
 8722 C0
 8723 E7
 8724 CD,E5,1B
 8727 A7
 8728 CD,4F,21
 8731 CD,1E,1F
 8734 32,CB,5C
 8737 FE,10
 8742 D2,3D,12
 8742 CD,30,12
 8745 A7
 8746 C9

SCF
 RET NZ
 RST 32 NEXT CHAR
 CALL 7141 TEM 6 (EXPECT 1#)
 AND A CLEAR FLAGS
 CALL 8527 UNSTACK Z
 CALL 7966 FIX-U1(FIND SINGLE INT)
 LD (23755), A STREAM #
 CP 16 (LAST CHAN =15)
 JP NC, 4669 ERR 0
 CALL 4656 SELECT CHAN
 AND A CLEAR FLAGS
 RET

INPUT COMMAND ROUTINE

8747 3A,C6,5C INPUT

LD A, (23750) CART FLAGS

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8750 CB,C7
8752 32,C6,5C
8755 CD,89,28
8758 28,08
8760 3E,01
8762 CD,30,12
8765 CD,A9,08
8768 FD,36,02,01 SKIP IF SYN
8772 CD,6B,22
8775 CD,44,1B
8778 ED,4B,88,5C
8782 3A,6B,5C
8785 B8
8786 38,03
8788 0E,21
8790 47
8791 ED,43,88,5C RESET S-POSN
8795 3E,19
8797 90
8798 32,8C,5C
8801 FD,CB,02,86
8805 CD,14,09
8808 C3,A9,08

```

INPUT SEQUENCE SUBROUTINE

```

8811 CD,ED,21      INPUT SEQ
8814 28,FB
8816 FE,28
8818 20,0E
8820 E7
8821 CD,7E,21
8824 DF
8825 FE,29
8827 C2,ED,1B
8830 E7
8831 C3,5C,23
8834 FE,CA          TRY LINE
8836 20,11
8838 E7             DO LINE
8839 CD,82,1B
8842 FD,CB,37,FE
8846 FD,CB,01,76
8850 C2,ED,1B
8853 18,0D
8855 CD,4B,30      IS IT ALPHA?
8858 D2,59,23
8861 CD,82,1B
8864 FD,CB,37,BE
8868 CD,89,28      IN PROMPT
8871 CA,5C,23
8874 CD,4E,13
8877 21,71,5C
8880 CB,BC
8882 CB,EE
8884 01,01,00

```

```

SET 0, A UPPER SCREEN
LD (23750),A RETURN FLAG
CALL 10377 INTERPRET?
JR Z, 8 (8767) SKIP IF SYNTAX
LD A, 1 OPEN CHAN K
CALL 4656 SELECT CHAN
CALL 2217 CL-LHS
LD (IY+2), 1 USE LOWER SCREEN
CALL 8811 INPUT SEQUENCE
CALL 6980 END?
LD BC, (23688) S-POSN
LD A, (23659) DF-Size
CP B
JR C, 3 (8791) RESET S-POSN
LD C, 33
LD B, A
LD (23688), BC S-POSN
LD A, 25
SUB B
LD (23692), A SCROLL COUNT
RES 0, (IY+2) USE UPPER SCREEN
CALL 2324 STORE CUR POSN
JP 2217 C-LHS

```

```

CALL 8685 PRINT SPACING
JR Z, 251 (8811) INPUT SEQ
CP 40 (?)
JR NZ, 14 (8834) TRY LINE
RST 32 NEXT CHAR
CALL 8574 PRINT SEQUENCE
RST 24 GET CHAR
CP 41 )?
JR NZ, 7149 SYN ERR
RST 32 NEXT CHAR
JP 9052 INPUT SEQ END
CP 202 LINE?
JR NZ, 17 (8855) IS IT ALPHA?
RST 32 NEXT CHAR
CALL 7042 CLASS 1
SET 7, (IY+55) LINE INPUT
BIT 6, (IY+1) STRING?
JP NZ, 7149 SYN ERR
JR 13 (8868) IN PROMPT
CALL 12362 APHA?
JP NC, 9049 INPUT SEQ REPEAT
CALL 7042 CLASS 1
RES 7, (IY+55) LINE INPUT OFF
CALL 10377 INTERPRET?
JP Z, 9052 INPUT SEQ END
CALL 4942 SET WORKSPACE
LD HL, 23665 AT FLAGS X
RES 6, (HL) STRING ON
SET 5, (HL) INPUT ON
LD BC, 1

```


8887 CB,7E		BIT 7, (HL) LINE INPUT?
8889 20,0B		JR NZ, 11 (8902) MAKE ROOM
8891 3A,3B,5C		LD A, (23611) FLAGS
8894 E6,40		AND 64 SAVE BIT 6 (# ON?)
8896 20,02		JR NZ, 2 (8900) SET # ON
8898 0E,03		LD C, 3 NEED 3 SPACES
8900 B6	SET # ON	OR (HL) ADD FLAG X
8901 77		LD (HL), A RESTORE FLAG X,
8902 F7	MAKE ROOM	RST 48 MAKE BC SPACES
8903 36,0D		LD (HL), 13 ENTER
8905 79		LD A, C
8906 0F		RRC A
8907 0F		RRC A TEST BIT 1
8908 30,05		JR NC, 5 (8915) ONE SPACE
8910 3E,22		LD A, 34 "
8912 12		LD (DE), A
8913 2B		DEC HL
8914 77		LD (HL), A
8915 22,5B,5C	ONE SPACE	LD (23643), HL K CUR
8918 FD,CB,37,7E		BIT 7, (IY+55) # ON?
8922 20,2C		JR NZ, 44 (8968) IN VAR-3
8924 2A,5D,5C		LD HL, (23645) CHAR ADDR
8927 E5		PUSH HL SAVE CHAR ADDR
8928 2A,3D,5C		LD HL, (23613) ERR SP
8931 E5		PUSH HL SAVE ERR SP
8932 21,E4,22	INPUT VAR-1	LD HL, 8932 INPUT VAR-1
8935 E5		PUSH HL RET IF ERROR
8936 FD,CB,30,66		BIT 4, (IY+48) RETYPE IF ERROR?
8940 28,04		JR Z, 4 (8946) IN VAR-2
8942 ED,73,3D,5C		LD (23613), SP ERR SP
8946 2A,61,5C	INPUT VAR-2	LD HL, (23649) WORKSPACE
8949 CD,0D,0D		CALL 3341 DESLUG
8952 FD,36,00,FF		LD (IY+0), 255 RESET ERR #
8956 CD,82,0A		CALL 2690 EDIT CUR
8959 FD,CB,01,BE		RES 7, (IU+1) INTERRUPT OFF?
8963 CD,63,23		CALL 9059 INPUT ASSIGN
8966 18,03		JR 3 (8971) INPUT VAR-4
8968 CD,82,0A	INPUT VAR-3	CALL 2690 EDIT CUR
8971 FD,36,22,00	INPUT VAR-4	LD (IY+34), 0 RESET CUR HI ADDR
8975 CD,80,23		CALL 9088 NOT K CHAN?
8978 20,0A		JR NZ, 10 (8990) SKIP ECHO
8980 CD,83,0C		CALL 3203 ECHO
8983 ED,4B,82,5C		LD BC, (23682) ECHO E
8987 CD,14,09		CALL 2324 STORE CUR
8990 21,71,5C	SKIP ECHO	LD HL, 23665 AT FLAGS X
8993 CB,AE		RES 5, (HL) PROG LINE ON
8995 CB,7E		BIT 7, (HL) INTERRUPT?
8997 CB,BE		RES 7, (HL) SYNTAX ON
8999 20,1C		JR NZ, 28 (9029) ENTER INPUT
9001 E1		POP HL DISCARD ERR RET ADDR
9002 E1		POP HL
9003 22,3D,5C		LD (23613), HL RESET SP
9006 E1		POP HL
9007 22,5F,5C		LD (23647), HL X POINTER
9010 FD,CB,01,FE		SET 7, (IY+1) INTERRUPT ON

```

9014 CD,63,23
9017 2A,5F,5C
9020 FD,36,26,00
9024 22,5D,5C
9027 18,17
9029 2A,63,5C ENTER INPUT
9032 ED,5B,61,5C
9036 37
9037 ED,52
9039 44
9040 4D
9041 CD,70,2E
9044 CD,BD,2E
9047 18,03
9049 CD,9B,21 INPUT SEQ REPEAT
9052 CD,ED,21 INPUT SEQ END
9055 CA,6B,22
9058 C9

```

INPUT ASSIGNMENT SUBROUTINE

```

9059 2A,61,5C INPUT ASSIGN
9062 22,5D,5C
9065 DF
9066 FE,E2
9068 28,0C
9070 3A,71,5C
9073 CD,BC,1B
9076 DF
9077 FE,0D
9079 C8
9080 CF ERR C
9081 0B
9082 CD,89,28 INPUT STOP
9085 C8
9086 CF ERR H
9087 10

```

INPUT CHANNEL K SUBROUTINE

```

9088 2A,51,5C NOT KB?(NOT K CHAN?) LD HL, (23633) CUR CHAN
9091 23 INC HL
9092 23 INC HL
9093 23 INC HL
9094 23 INC HL
9095 7E LD A, (HL)
9096 FE,4B CP 75 K?
9098 C9 RET

```

COLOR ITEM ROUTINES

```

9099 E7 READ NEXT COLOR CHAR RST 32 NEXT CHAR
9100 CD,9C,23 GR COLOR CALL 9116 CK TEMP COLOR TOKENS
9103 DB RET C
9104 DF RST 24 GET CHAR
9105 FE,2C CP 44 ", "?
9107 28,F6 JR Z, 246 (9099) READ NXT COL CH
9109 FE,3B CP 59 ; ?

```

```

CALL 9059 CK INPUT TOKEN
LD HL, (23647) X POINTER
LD (IY+38), 0 HI BYTE X POINTER
LD (23645), HL CHAR ADDR
JR 23 (9052) INPUT SEQ END
LD HL, (23651) STK BOTTOM
LD DE, (23649) WORK SPACE
SCF
SBC HL, DE FIND LENGTH
LD B, H
LD C, L LENGTH TO BC
CALL 11888 GET STRING PARAMETERS
CALL 11965 LET
JR 3 (9052) INPUT SEQ END
CALL 8603 PRINT ITEMS
CALL 8685 PRINT SPACING
JP Z, 8811 INPUT SEQUENCE
RET

```

```

LD HL, (23649) WORK SPACE
LD (23645), HL CHAR ADDR
RST 24 GET CHAR
CP 226 STOP?
JR Z, 12 (9082) INPUT STOP
LD A, (23655) FLAGS X
CALL 7100 LT22(GET A VALUE-1)
RST 24 GET CHAR
CP 13 ENTER?
RET Z
RST 8 ERROR
C Nonsense in BASIC
CALL 10377 INTERPRET?
RET Z
RST 8 ERROR
H STOP in INPUT

```

```

9111 8,F2                JR Z, 242 (9099) READ NXT COL CH
9113 C3,ED,1B           JF 7149 SYN-ERR
9116 FE,D9 CK TEMP COLOR TOKEN CP 217 INK?
9118 D8                 RET C
9119 FE,DF             CP 223 OUT?
9121 3F                CCF
9122 D8                 RET C
9123 F5                PUSH AF SAVE TOKEN
9124 E7                RST 32 NEXT CHAR
9125 F1                POP AF GET TOKEN BACK
9126 D6,C9 CHANGE TOKEN TO CON SUB 201 CONVERT TO CONTROL #
9128 F5                PUSH AF SAVE CONTROL #
9129 CD,E5,18          CALL 7141 TEM 6(EXPECT 1#)
9132 F1                POP AF GET CONTROL # BACK
9133 A7                AND A CLEAR FLAGS
9134 CD,4F,21          CALL 8527 UNSTACK Z
9137 F5                PUSH AF
9138 CD,1E,1F          CALL 7966 FIX-U1(FIND SINGLE INT
9141 57                LD D, A
9142 F1                POP AF CONTROL # BACK
9143 D7                RST 16 PRINT CHAR
9144 7A                LD A, D
9145 D7                RST 16 PRINT CHAR (#)
9146 C9                RET

```

COLOR CHANGE SUBROUTINE

```

9147 D6,11             TV COLOR SUB 17
9149 CE,00             ADC A, 0
9151 28,1D             JR Z, 29 (9182) COLOR
9153 D6,02             SUB A, 2
9155 CE,00             ADC A, 0
9157 28,56             JR Z, 86 (9245) HIFLASH
9159 FE,01             CP 1
9161 7A                LD A, D
9162 06,01             LD B, 1 MASK FOR OVER
9164 20,04             JR NZ, 4 (9170) OVER/INVERSE
9166 07                RLC A
9167 07                RLC A X4
9168 06,04             LD B, 4 MASK FOR INVERSE
9170 4F                LD C, A
OVER/INVERSE          LD A, D
9171 7A                CP 2 ONLY 1 OR 0 ALLOWED
9172 FE,02             JR NC, 22 (9198) ERR E
9174 30,16             LD A, C
9176 79                LD HL, 23697 AT P FLAGS
9177 21,91,5C          JR 56 (9238) TV COLOR CHANGE
9180 18,38             LD A, D
9182 7A                LD B, 7 WHITE
COLOR                 JR C, 5 (9192) SKIP DEFAULTS
9183 06,07             RLC A
9185 38,05             RLC A
9187 07                RLC A X 8
9188 07                LD B, 56
9189 07                LD C, A
9190 06,38             DEFAULT
9192 4F                SKIP DEFAULT
9193 7A                LD A, D

```

9194	FE,0A		CP 10
9196	38,02		JR C, 2 (9200) SKIP ERROR
9198	CF	ERR K	RST 8 ERROR
9199	13		K Invalid color
9200	21,8F,5C	SKIP ERROR	LD HL, 23695 AT ATTR T
9203	FE,08		CP 8
9205	38,0B	COLOR 9	JR C, 11 (9218) COLOR T-A
9207	7E		LD A, (HL)
9208	28,07		JR Z, 7 (9217) COLOR T-B
9210	B0		OR B
9211	2F		CPL
9212	E6,24		AND 36
9214	28,01		JR Z, 1 (9217) COLOR T-A
9216	78		LD A, B
9217	4F	COLOR T-A	LD C, A
9218	79	COLOR T-B	LD A, C
9219	CD,16,24		CALL 9238 TV COLOR CHANGE
9222	3E,07		LD A, 7
9224	BA		CP D
9225	9F		SBC A, A
9226	CD,16,24		CALL 9238 TV COLOR CHANGE
9229	07		RLC A
9230	07		RLC A X4
9231	E6,50		AND 80 SAVE BITS 4 & 6
9233	47		LD B, A
9234	3E,08		LD A, B
9236	BA		CP D
9237	9F		SBC A, A
9238	AE	TV COLOR CHANGE	XOR (HL)
9239	A0		AND B
9240	AE		XOR (HL)
9241	77		LD (HL), A
9242	23		INC HL
9243	78		LD A, B
9244	C9		RET
BRIGHT AND FLASH SUBROUTINES			
9245	9F	HIFLASH	SBC A, A
9246	7A		LD A, D
9247	0F		RRC A
9248	06,80		LD B, 128 SET FLASH
9250	20,03		JR NZ, 3 (9255) SKIP BRIGHT
9252	0F		RRC A
9253	06,40		LD B, 64 SET BRIGHT
9255	4F	SKIP BRIGHT	LD C, A
9256	7A		LD A, D
9257	FE,08		CP 8
9259	28,04		JR Z, 4 (9265) SKIP ERROR
9261	FE,02		CP 2 ONLY 1 OR 0 ALLOWED
9263	30,BD	ERR K	JR NC, 189 (9198) ERR K
9265	79	SKIP ERROR	LD A, C
9266	21,8F,5C		LD HL, 23695 AT ATTR T
9269	CD,16,24		CALL 9238 TV COLOR CHANGE
9272	79		LD A, C
9273	0F		RRC A

9274 OF
9275 OF
9276 18,D8

RRC A
RRC A DIVIDE BY 8
JR 216 (9238) TV COLOR CHANGE

BORDER COMMAND ROUTINE

9278 CD,1E,1F BORDER
9281 FE,08
9283 30,A9
9285 D3,FE
9287 07
9288 07
9289 07
9290 CB,6F
9292 20,02
9294 EE,07
9296 32,48,5C SET BORDER
9299 C9

CALL 7955 FIX-U1(FIND SINGLE INT)
CP 8
JR NC, 169 (9198) ERR K,
OUT (254), A
RRC A
RRC A
RRC A DIVIDE BY 8
BIT 5, A
JR NZ, 2 (9296) SET BORDER
XOR 7
LD (23624), A BORDER
RET

RESET COMMAND ROUTINE

9300 DF RESET
9301 FE,2A
9303 20,26
9305 CD,20,00
9308 CD,44,18
9311 C9
9312 3E,10 RESET STREAMS
9314 21,16,5C
9317 CD,A8,13 DO STREAMS
9320 23
9321 23
9322 3D
9323 20,F8
9325 21,F4,09 RESET CHANNELS
9328 E5
9329 06,FE
9331 DE,88 CALL EROM
9333 C5
9334 01,00,00
9337 C5
9338 C5
9339 CD,D0,65
9342 C9
9343 FE,23 CK "#"
9345 28,15
9347 CD,44,1B
9350 C9
9351 21,4C,0C RESET MODE
9354 E5
9355 01,FE,FE
9358 C5
9359 01,00,00
9362 C5
9363 C5
9364 CD,D0,65
9367 C9

RST 24 GET CHAR
CP 42 *?
JR NZ, 38 (9343) CK "#"
CALL 32 NEXT CHAR
CALL 6980 END?
RET
LD A, 16
LD HL, 23574 AT STREAMS POSN 5
CALL 5032 RST STREAM
INC HL NEXT STREAM
INC HL
DEC A
JR NZ, 248 (9317) DO STREAMS
LD HL, 2548 CHANNEL DATA
PUSH HL
LD B, 254 SETUP CALL BANK
LD C, 136
PUSH BC
LD BC, 0
PUSH BC
PUSH BC
CALL 26064 CALL BANK
RET
CP 35 #?
JR Z, 21 (9368) GET PARAMETERS
CALL 6980 END?
RET
LD HL, 3148 KEY MODE
PUSH HL A RETURN
LD BC, FEFE(HEX) SETUP CALL BANK
PUSH BC
LD BC, 0
PUSH BC
PUSH BC
CALL 26064 CALL BANK
RET

RESET PARAMETERS SUBROUTINE

```

9368 E7          GET PARAM
9369 CD,E5,1B
9372 CD,44,1B
9375 CD,1E,1F
9378 FE,11
9380 30,11
9382 A7
9383 FA,B7,24
9386 87
9387 C6,16
9389 6F
9390 26,5C
9392 5E
9393 23
9394 56
9395 7A
9396 B3
9397 20,02
9399 CF          ERR 0
9400 17
9401 7A          SKIP ERR
9402 FE,80
9404 D8
9405 C3,67,25
9408 D6,80      CART RESET
9410 57
9411 ED,5B,BC,5C
9415 19
9416 23
9417 46
9418 16,00
9420 1E,12
9422 19
9423 E5
9424 18,A1

```

```

RST 32 NEXT CHAR
CALL 7141 TEM 6(EXPECT 1#)
CALL 6980 END?
CALL 7966 FIX-U1(FIND SINGLE INT
CP 17 (ONLY 16 STREAMS)
JR NC, 17 (9399) ERR 0
AND A CLEAR FLAGS
JP N, 9399 ERR 0
AND A, A
ADD A, 22
LD L, A
LD H, 92 AT STREAM DATA
LD E (HL)
INC HL
LD D, (HL)
LD A, D
OR E DE=0?
JR NZ, 2 (9401) SKIP ERROR
RST 8 ERROR
0 Invalid stream
LD A, D
CP 128
RET C
JP 9575 ERR J
SUB 128
LD D, A
LD DE, (23740) SYS CONF TABLE ADD
ADD HL, DE
INC HL
LD B, (HL)
LD D, 0
LD E, 18
ADD HL, DE
PUSH HL
JR 161 (9331) CALL EROM

```

NEW DEVICE ROUTINE

```

9426 DF          NEW DEV
9427 FE,2A
9429 C2,47,25
9432 E7
9433 CD,EF,1B
9436 FE,2C
9438 C2,ED,1B
9441 CD,89,28
9444 20,06
9446 CD,69,25
9449 CD,44,1B
9452 18,79      CALL ERROR J
9454 CD,AF,2F
9457 0B
9458 78
9459 B1

```

```

RST 24 GET CHAR
CP 42 *?
JP NZ, 9543 SAVE/LOAD/VERIFY/MERG
RST 32 NEXT CHAR
CALL 7151 TEM 10
CP 44 ", "?
JP N, 7149 SYN ERR
CALL 10377 INTERPRET?
JR NZ, 6 (9452) CALL ERR J
CALL 9577 SKIP IT
CALL 6980 END?
JR 121 (9575) ERR J
CALL 12207 GET STRING PARAM
DEC BC
LD A, B
OR C BC=0?

```


9460 20,17		JR NZ, 113 (9575) ERR J
9462 1A		LD A, (DE)
9463 E6,DF		AND 223
9465 4F		LD C, A
9466 CD,74,13		CALL 4980 SEARCH CART SYS CONF
9469 D2,67,25		JP NC, 9575 ERR J
9472 E5		PUSH HL
9473 11,14,00		LD DE, 20
9476 19		ADD HL, DE
9477 7E		LD A, (HL)
9478 CB,4F		BIT 1, A
9480 CA,67,25		JP Z, 9575 ERR J
9483 E1		POP HL
9484 EB		EX DE, HL
9485 CD,B9,25		CALL 9657 PASS EM
9488 EB		EX DE, HL
9489 3A,74,5C		LD A, (23668) S-POSN
9492 A7		AND A CLEAR FALGS
9493 FE,00		CP 0
9495 38,26		JR C, 38 (9535) SAVE
9497 28,28		JR Z, 40 (9539) LOAD
9499 C6,D4		ADD A, 212 FOR VARIABLE
9501 4F	CALL EROM	LD C, A
9502 C5		PUSH BC
9503 56		LD D, (HL)
9504 1E,88		LD E, 136
9506 01,0C,00		LD BC, 12
9509 09		ADD HL, BC
9510 4E		LD C, (HL)
9511 23		INC HL
9512 46		LD B, (HL)
9513 C5		PUSH BC
9514 D5		PUSH DE
9515 2A,65,5C		LD HL, (23653) STK END
9518 2B		DEC HL
9519 4E		LD C, (HL)
9520 0C		INC C
9521 22,65,5C		LD (23653), HL STK END
9524 06,00		LD B, 0
9526 C5		PUSH BC
9527 01,00,00		LD BC, 0
9530 C5		PUSH BC
9531 CD,D0,65		CALL 26064 CALL BANK
9534 C9		RET
9535 0E,F8	NEW DEV SAVE	LD C, 248 SAVE
9537 18,DB		JR 219 (9501) CALL EROM
9539 0E,5F		LD C, 239 LOAD
9541 18,DF		JR 215 (9501) CALL EROM

SAVE-LOAD-VERIFY-MERGE ROUTINE

9543 F1	SLVM	POP AF
9544 01,AB,01		LD BC 427 SLVM ADDR EROM
9547 C5		PUSH BC
9548 01,FE,FE		LD BC, 254/254
9551 C5		PUSH BC

9552 01,00,00		LD BC ,0
9555 C5		PUSH BC
9556 C5		PUSH BC
9557 3A,C2,5C		LD A, (23746) VID MODE
9560 A7		AND A CLEAR FLAGS
9561 20,07		JR NZ, 7 (9570) 2 SCREEN MODE
9563 CD,D0,65		CALL 26064 CALL BANK (LOW)
9566 CD,44,1B	CK END	CALL 6980 END?
9569 C9		RET
VIDEO 2 SCREEN SURROUTINE		
9570 CD,90,FD	2 SCREEN MODE	CALL 64912 CALL BANK (HIGH)
9573 18,F7		JR 247 (9566) CK END
9575 CF	ERR J	RST 8 ERROR
9576 12		J Invalid I/O device
CARTRIDGE SKIP ROUTINE		
9577 3A,C6,5C	SKIP IT	LD A, (23750) CART FLAGS
9580 CB,8F		RES 1, A USE TOP SCREEN
9582 32,C6,5C		LD (23750) RESTORE FLAGS
9585 C5		PUSH BC
9586 DF		RST 24 GET CHAR
9587 FE,22	FIND END	CP 34 "?"
9589 28,0B		JR Z, 11 (9602) END FOUND
9591 FE,3A		CP 58 :?
9593 28,07		JR Z, 7 (9602) END FOUND
9595 FE,0D		CP 13 ENTER?
9597 28,03		JR Z, 3 (9602) END FOUND
9599 E7		RST 24 GET CHAR
9600 18,F1		JR 241 (9587) FIND END
9602 FE,3A	END FOUND	CP 58 :?
9604 20,07		JR NZ, 7 (9613) IS IT #?
9606 3A,C6,5C		LD A, (23750) CART FLAGS
9609 CB,4F		BIT 1, A TOP SCREEN?
9611 20,29		JR NZ, 41 (9654) GET NEXT CHAR
9613 E5	IS IT #?	PUSH HL
9614 06,05		LD B, 5 NEED 5 SPACES FOR SLUG
9616 2B	FIND SLUG	DEC HL
9617 7E		LD A, (HL)
9618 FE,0E		CP 14 SLUG?
9620 28,1F		JR Z, 31 (9653) CONTINUE WITH #
9622 10,F8		JR NZ, 248 (9616) FIND SLUG
9624 E1		POP HL
9625 DF		RST 24 GET CHAR
9626 FE,22		CP 34 "?"
9628 20,15		JR NZ, 21 (9651) NEXT LINE
9630 3A,C6,5C		LD A, (23750) CART FLAGS
9633 CB,4F		BIT 1, A UPPER SCREEN?
9635 20,07		JR NZ, 7 (9644) SCREEN OFF
9637 CB,4F		SET 1, A UPPER SCREEN ON
9639 32,C6,5C		LD (23750), A RETURN CART FLAG
9642 18,0A		JR 10 (9653) CONTINUE WITH #
9644 CB,8F	SCREEN OFF	RES 1, A USE LOWER SCREEN
9646 32,C6,5C		LD (23750), A RETURN CART FLAGS
9649 18,03		JR 3 (9654) GET NEXT CHAR

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9651 C1                NEXT LINE      POP BC
9652 C9                RET
9653 E1                CONTINUE WITH #  POP HL
9654 E7                GET NEXT CHAR    RST 24 GET CHAR
9655 18,BA             JR 186 (9587) FIND END

PASS TO BANK 254 ROUTINE
9657 01,FE,FE          PASS EM         LD BC, 254/254
9660 CD,99,64          CALL 25753 BANK ENABLE
9663 CD,09,0F          CALL 3849 ??ERROR?? RESULTS IN
LD (BC), A AND REST OF REPORT ROUTINE. SHOULD BE CALL 3845?
FROM 3849 DOESN'T MAKE SENSE EITHER
9666 01,00,FF          LD B, BANK 255, C= 0
9669 CD,99,64          CALL 25753 BANK ENABLE

ENTRY POINT FOR CAT
9672 06,CF             CAT              LD B, 207 CAT
9674 18,0A             JR 10 (9686) CK SYNTAX

ENTRY POINT FOR FORMAT
9676 06,D0             FORMAT          LD B, 208 FORMAT
9678 18,06             JR 6 (9686) CK SYNTAX

ENTRY POINT FOR MOVE
9680 06,D1             MOVE            LD B, 209 MOVE
9682 18,02             JR 2 (9686) CK SYNTAX

ENTRY POINT FOR ERASE
9684 06,D2             ERASE           LD B, 210 ERASE
9686 CD,89,28          CK SYNTAX       CALL 10377 INTERPRET?
9689 20,06             JR NZ, 6 (9697) ERR J
9691 CD,69,25          CALL 9577 SKIP IT
9694 CD,44,1B          CALL 6980 END?
9697 C3,67,25          ERR J           JP 9575 ERR J

GARBAGE -THIS IS THE SAME ROUTINE AS AT 9506. IT IS NEVER USED.
9700 01,0C,00          LD BC, 12
9703 09               ADD HL, BC
9704 4E               LD C, (HL)
9705 23               INC HL
9706 46               LD B, (HL)
9707 C5               PUSH BC
9708 D5               PUSH DE
9709 2A,65,5C         LD HL, (23653) STK END
9712 2B               DEC HL
9713 4E               LD C, (HL)
9714 0C               INC C
9715 22,65,5C         LD (23653), HL STK END
9718 06,00            LD B, 0
9720 C5               PUSH BC
9721 01,00,00         LD BC, 0
9724 C5               PUSH BC
9725 CD,D0,65         CALL 26064 CALL BANK
9728 C9               RET
9729 CF               ERR J           RST 8 ERROR

```

9730 12

J Invalid I/O device

PIXEL ADDRESS SUBROUTINE (FOR PLOT AND POINT)

```

9731 3E,AF SCRAMBLE (GET PIXEL ADDR) LD A, 175 Y MAX (BC=COORD)
9733 90          DO Y      SUB B
9734 DA,52,28      JP C, 10322 ERR B
9737 47          LD B, A B=175 - Y
9738 A7          AND A CLEAR FLAGS
9739 1F          RR A
9740 37          SCF
9741 1F          RR A
9742 A7          AND A CLEAR FLAGS
9743 1F          RR A
9744 A8          XOR B
9745 E6,F8      AND 248 CLEAR 3 LOW BITS
9747 A8          XOR B
9748 67          LD H, A
9749 79          DO X      LD A, C
9750 07          RLC A ROTATE BACK 3
9751 07          RLC A
9752 07          RLC A
9753 A8          XOR B
9754 E6,C7      AND 199 CLEAR 3,4 & 5 BIT
9756 A8          XOR A
9757 07          RLC A
9758 07          RLC A
9759 6F          LD L, A
9760 79          LD A, C
9761 E6,07      AND 7 CLEAR 3 LOW BITS
9763 C9          RET

```

POINT SUBROUTINE

```

9764 CD,60,26      FIND POINT  CALL 9824 GET X,Y
9767 CD,03,26      CALL 9731 SCRAMBLE
9770 47          LD B, A
9771 04          INC B
9772 7E          LD A, (HL)
9773 07          POINT LOOP  RLC A
9774 10,FD      DJNZ, 253 (9774) POINT LOOP
9776 E6,01      AND 1 CLEAR BIT 1
9778 C3,E6,30    JP 12518 STK A

```

PLOT COMMAND ROUTINE

```

9781 CD,60,26      PLOT      CALL 9824 GET X,Y
9784 CD,3E,26      CALL 9790 PLOT BC
9787 C3,88,08      JP 2184 R ATTR TEMP
9790 ED,43,7D,5C    PLOT BC  LD (23677), BC COORDINATES
9794 CD,03,26      CALL 9731 SCRAMBLE
9797 47          LD B, A
9798 04          INC B
9799 3E,FE      LD A, 254
9801 0F          PLOT LOOP  RRC A
9802 10,FD      DJNZ, 253 (9801) PLOT LOOP
9804 47          LD B, A
9805 7E          LD A, (HL)

```

```

9806 FD,4E,57      LD C, (IY+87) P FLAG
9809 CB,41          BIT 0, C  OVER ON?
9811 20,01          JR NZ, 1 (9814) TEST INVERSE
9813 A0             AND B
9814 CB,51          TEST INVERSE  BIT 2, C INVERSE ON?
9816 A8             JR NZ, 2 (9820) PLOT END
9818 A8             XOR B
9819 2F             CPL
9820 77             PLOT END      LD (HL), A
9821 C3,10,07       JP 1808 ATTR BYTE

```

STACK TO BC SUBROUTINE

```

9824 CD,6D,26 GET X,T(STK TO BC) CALL 9837 GET COORDIN(STK TO A)
9827 47             LD B, A
9828 C5             PUSH BC
9829 CD,6D,26       CALL 9837 GET COORDINATES(STK TO
9832 59             LD E, C                      A)
9833 C1             POP BC
9834 51             LD D, C
9835 4F             LD C, A
9836 C9             RET      B=Y,D=Y SIGN;C=X,E=X SIGN

```

STACK TO A SUBROUTINE

```

9837 CD,93,31 GET COORDINATES CALL 12691 FP TO A
9840 DA,52,28       (STK TO A)  JP C, 10322 ERR B
9843 0E,03          LD C, 1
9845 C8             RET Z
9846 0E,FF          LD C, 255
9848 C9             RET

```

CIRCLE COMMAND ROUTINE

```

9849 DF             CIRCLE      RST 24 GET CHAR
9850 FE,2C          CP 44,"","?"
9852 C2,ED,1B       JP NZ, 7149 SYN ERR
9855 E7             RST 32 NEXT CHAR
9856 CD,E5,1B       CALL 7146 TEM (EXPECT 1 #)
9859 CD,44,1B       CALL 6980 END?
9862 EF             RST 40 FP CALC
9863 2A             ABS
9864 3D             E TO FP
9865 38             END FP
9866 7E             LD A, (HL)
9867 FE,81          CP 129 RADIUS <1?
9869 30,05          JR NC, 5 (9876) R>1
9871 EF             RST 40 FP CALC
9872 02             DELETE
9873 38             END FP
9874 18,A1          JR 161 (9781) PLOT
9876 EF             RST 40 FP CALC
9877 A3             STK PI/2
9878 38             END FP
9879 36,83          LD (HL), 131 (PI/2 TO 2*PI)
9881 EF             RST 40 FP CALC
9882 C5             STK TO MEM 5
9883 02             DELETE

```

9884 38		END FP
9885 CD, D6, 27		CALL 10198 DRAW PARAMETER-1
9888 C5		PUSH BC SAVE ARC COUNT
9889 EF		RST 40 FP CALC
9890 31		DUPLICATE
9891 E1		GET MEM 1
9892 04		MULTIPLY
9893 38		END FP
9894 7E		LD A, (HL)
9895 FE, 80		CP 128 1/27
9897 30, 08		JR NC, 8 (9907) ARC >1
9899 EF		RST 40 FP CALC
9900 02		DELETE
9901 02		DELETE
9902 38		END FP
9903 C1		POP BC
9904 C3, 35, 26		JP 9781 PLOT
9907 EF	ARC >1	RST 40 FP CALC
9908 C2		STK TO MEM 2
9909 01		EXCHANGE
9910 C0		STK TO MEM 0
9911 02		DELETE
9912 03		SUBTRACT
9913 01		EXCHANGE
9914 E0		GET MEM 0
9915 0F		ADD
9916 C0		STK TO MEM 0
9917 01		EXCHANGE
9918 31		DUPLICATE
9919 E0		GET MEM 0
9920 01		EXCHANGE
9921 31		DUPLICATE
9922 E0		GET MEM 0
9923 A0		STK 0
9924 C1		STK TO MEM 0
9925 02		DELETE
9926 38		END FP
9927 FD, 34, 62		INC (IY+98) MEM STK 2, POSN 0
9930 CD, 1E, 1F		CALL 7966 FIX-U1(FIND SINGLE INT)
9933 6F		LD L, A
9934 E5		PUSH HL SAVE X+Z
9935 CD, 1E, 1F		CALL 7966 FIX-U1(FIND SINGLE INT)
9938 E1		POP HL
9939 67		LD H, A H= Y-Z*SIN(PI/2)
9940 22, 7D, 5C		LD (23677), HL COORDINATES
9943 C1		POP BC GET ARC COUNT
9944 C3, 79, 27		JP 10105 DRAW STEPS
DRAW COMMAND ROUTINE		
9947 DF	DRAW	RST 24 GET CHAR
9948 FE, 2C		CP ", "?
9950 28, 06		JR Z, 6 (9958) GET ANGLE
9952 CD, 44, 1B		CALL 6980 END?
9955 C3, D0, 27		JP 10192 LINE DRAW
9958 E7	GET ANGLE	RST 32 NEXT CHAR

9959 CD,E5,1B		CALL 7141 TEM 6 (EXPECT 1 #)
9962 CD,44,1B		CALL 6980 END?
9965 EF		RST 40 FP CALC
9966 C5		STK TO MEM 5
9967 A2		STK 1/2
9968 0A		MULTIPLY
9969 1F		SIN
9970 31		DUPLICATE
9971 30		NOT
9972 30		NOT
9973 00,06		JUMP IF TRUE, 6 (9980) SIN <> 0
9975 02		DELETE
9976 38		END FP
9977 C3,D0,27		JP 10192 LINE DRAW
9980 C0	SIN <> 0	STK TO MEM 0
9981 02		DELETE
9982 C1		STK TO MEM 1
9983 02		DELETE
9984 31		DUPLICATE
9985 2A		ABS
9986 E1		GET MEM 1
9987 01		EXCHANGE
9988 E1		GET MEM 1
9989 2A		ABS
9990 0F		ADD
9991 E0		GET MEM 1
9992 05		DIVIDE
9993 2A		ABS
9994 E0		GET MEM 0
9995 01		EXCHANGE
9996 3D		E TO FP
9997 38		END FP
9998 7E		LD A, (HL)
9999 FE,81		CP 129 Z>=1?
10001 30,07		JR NC, 7 (10010) DRAW PARAMETERS
10003 EF		RST 40 FP CALC
10004 02		DELETE
10005 02		DELETE
10006 38		END FP
10007 C3,D0,27		JP 10192 LINE DRAW
10010 CD,D6,27 DRAW PARAMETERS		CALL 10198 DRAW PARAMETERS
10013 C5		PUSH BC SAVE ARC COUNT
10014 EF		RST 40 FP CALC
10015 02		DELETE
10016 E1		GET MEM 1
10017 01		EXCHANGE
10018 05		DIVIDE
10019 C1		STK TO MEM 1
10020 02		DELETE
10021 01		EXCHANGE
10022 31		DUPLICATE
10023 E1		GET MEM 1
10024 04		MULTIPLY
10025 C2		STK TO MEM 2
10026 02		DELETE

10027 01	EXCHANGE
10028 31	DUPLICATE
10029 E1	GET MEM 1
10030 04	MULTIPLY
10031 E2	GET MEM 2
10032 E5	GET MEM 5
10033 E0	GET MEM 0
10034 03	SUBTRACT
10035 A2	STK 1/2
10036 04	MULTIPLY
10037 31	DUPLICATE
10038 1F	SIN
10039 C5	STK TO MEM 5
10040 02	DELETE
10041 20	COS
10042 C0	STK TO MEM 0
10043 02	DELETE
10044 C2	STK TO MEM 2
10045 02	DELETE
10046 C1	STK TO MEM 1
10047 E5	GET MEM 5
10048 04	MULTIPLY
10049 E0	GET MEM 0
10050 E2	GET MEM 2
10051 04	MULTIPLY
10052 0F	ADD
10053 E1	GET MEM 1
10054 01	EXCHANGE
10055 C1	STK TO MEM 1
10056 02	DELETE
10057 E0	GET MEM 0
10058 04	MULTIPLY
10059 E2	GET MEM 2
10060 E5	GET MEM 5
10061 04	MULTIPLY
10062 03	SUBTRACT
10063 C2	STK TO MEM 2
10064 2A	ABS
10065 E1	GET MEM 1
10066 2A	ABS
10067 0F	ADD
10068 02	DELETE
10069 38	END FP
10070 1A	LD A, (DE)
10071 FE,81	CP 129 <1?
10073 C1	POP BC
10074 DA,D0,27	JP C, 10192 LINE DRAW
10077 C5	PUSH BC
10078 EF	RST 40 FP CALC
10079 01	EXCHANGE
10080 38	END FP
10081 3A,7D,5C	LD A, (23677) X COORDINATE
10084 CD,E6,30	CALL 12518 STK A
10087 EF	RST 40 FP CALC
10088 C0	STK TO MEM 0

10089 OF		ADD
10090 01		EXCHANGE
10091 38		END FP
10092 3A,7E,5C		LD A, (23678) Y COORDINATE
10095 CD,E6,30		CALL 12518 STK A
10098 EF		RST 40 FP CALC
10099 C5		ADD
10100 OF		GET MEM 0
10102 E5		GET MEM 5
10103 38		END FP
10104 C1		POP BC
10105 05	DRAW STEPS	DEC B
10106 28,3C		JR Z, 60 (10168) ARC END
10108 18,14		JR 20 (10130) ARC START
10110 EF	RECALC X,Y	RST 40 FP CALC
10111 E1		GET MEM 1
10112 31		DUPLICATE
10113 E3		GET MEM 3
10114 04		MULTIPLY
10115 E2		GET MEM 2
10116 E4		GET MEM 4
10117 04		MULTIPLY
10118 03		SUBTRACT
10119 C1		STK TO MEM 1
10120 02		DELETE
10121 E4		GET MEM 4
10122 04		MULTIPLY
10123 E2		GET MEM 2
10124 E3		GET MEM 4
10125 04		MULTIPLY
10126 OF		ADD
10127 C2		STK TO MEM 2
10128 02		DELETE
10129 38		END FP
10130 C5	ARC START	PUSH BC
10131 EF		RST 40 FP CALC
10132 C0		STK TO MEM 0
10133 02		DELETE
10134 E1		GET MEM 1
10135 OF		ADD
10136 31		DUPLICATE
10137 38		END FP
10138 3A,7D,5C		LD A, (23677) X COORDINATE
10141 CD,E6,30		CALL 12518 STK A
10144 EF		RST 40 FP CALC
10145 03		SUBTRACT
10146 E0		GET MEM 0
10147 E2		GET MEM 2
10148 OF		ADD
10149 C0		STK TO MEM 0
10150 01		EXCHANGE
10151 E0		GET MEM 0
10152 38		END FP
10153 3A,7E,5C		LD A, (23678) Y COORDINATE
10156 CD,E6,30		CALL 12518 STK A

10159 EF		RST 40 FP CALC
10160 03		SUBTRACT
10161 38		END FP
10162 CD, 10, 28		CALL 10256 DRAW LINE
10165 C1		POP BC
10166 10, C6		DJNZ, 198 (10110) RECALC X, Y
10168 EF	ARC END	RST 40 FP CALC
10169 02		DELETE
10170 02		DELETE
10171 01		EXCHANGE
10172 38		END FP
10173 3A, 7D, 5C		LD A, (23677) X COORDINATE
10176 CD, E6, 30		CALL 12518 STK A
10179 EF		RST 40 FP CALC
10180 03		SUBTRACT
10181 01		EXCHANGE
10182 38		END FP
10183 3A, 7E, 5C		LD A, (23678) Y COORDINATE
10186 CD, E6, 30		CALL 12518 STK A
10189 EF		RST 40 FP CALC
10190 03		SUBTRACT
10191 38		END FP
10192 CD, 10, 28	LINE DRAW	CALL 10256 DRAW LINE
10195 C3, 88, 08		JP 2184 R ATTR TEMP

INITIAL PARAMETERS SUBROUTINE

10198 EF	DRAW PARAMETERS	RST 40 FP CALC
10199 31		DUPLICATE
10200 28		SQR
10201 34		STK DATA
10202 32, 00		EXP B2, +00, (+00, +00, +00)
10204 01		EXCHANGE
10205 05		DIVIDE
10206 E5		GET MEM 5
10207 01		EXCHANGE
10208 05		DIVIDE
10209 2A		ABS
10210 38		END FP
10211 CD, 93, 31		CALL 12691 FP TO A
10214 38, 06		JR C, 6 (10222) USE 252 (=>256)
10216 E6, FC		AND 252 CLEAR 2 LOW BITS
10218 C6, 04		ADD A, 4 USE AT LEAST 4
10220 30, 02		JR NC, 2 (10224) DRAW SAVE
10222 3E, FC	USE 252	LD A, 252
10224 F5	DRAW SAVE	PUSH AF
10225 CD, E6, 30		CALL 12518 STK A
10228 EF		RST 40 FP CALC
10229 E5		GET MEM 5
10230 01		EXCHANGE
10231 05		DIVIDE
10232 31		DUPLICATE
10233 1F		SIN
10234 C4		STK TO MEM 4
10235 02		DELETE
10236 31		DUPLICATE

10237 A2	STK 1/2
10238 04	MULTIPLY
10239 1F	SIN
10240 C1	STK TO MEM 1
10241 01	EXCHANGE
10242 C0	STK TO MEM 0
10243 02	DELETE
10244 31	DUPLICATE
10245 04	MULTIPLY
10246 31	DUPLICATE
10247 0F	ADD
10248 A1	STK 1
10249 03	SUBTRACT
10250 1B	NEGATE
10251 C3	STK TO MEM 3
10252 02	DELETE
10253 38	END FP
10254 C1	POP BC
10255 C9	RET

LINE DRAWING SUBROUTINE

B= ABS Y, C= ABS X, D=SGN Y, E=SGN X

10256 CD, 60, 26	DRAW L	CALL 9824 GET X,Y (STK TO BC)
10259 79	DRAW LINE	LD A, C
10260 B8		CP B
10261 30, 06		JR NC, 6 (10269) X>Y
10263 69		LD L, C
10264 D5		PUSH DE
10265 AF		XOR A CLEAR A & CARRY
10266 5F		LD E, A
10267 18, 07		JR 7 (10276) L-LARGER
10269 B1	X>Y	OR C
10270 C8		RET C
10271 68		LD L, B
10272 41		LD B, C
10273 D5		PUSH DE SAVE DIAGONAL STEP
10274 16, 00		LD D, 0
10276 60	L-LARGER	LD H, B
10277 78		LD A, B
10278 1F		RR A
10279 85	DRAW LINE LOOP	ADD A, L
10280 38, 03		JR C, 3 (10285) DIAGONAL
10282 BD		CP H
10283 28, 07		JR C, 7 (10292) HORIZ-VERT
10285 94	DIAGONAL	SUB H
10286 4F		LD C, A
10287 D9		EXX
10288 C1		POP BC
10289 C5		PUSH BC
10290 18, 04		JR 4 (10296) STEP
10292 4F	HORIZ-VERT	LD C, A
10293 D5		PUSH DE
10294 D9		EXX
10295 C1		POP BC
10296 2A, 7D, 5C	STEP	LD HL, (23677) X,Y COORDIATES

10299	78		LD A, B
10300	84		ADD A, H
10301	47		LD B, A
10302	79		LD A, C
10303	3C		INC A
10304	85		ADD A, L
10305	38,0D		JR C, 13 (10320) RANGE
10307	28,0D		JR Z, 13 (10322) ERR B
10309	3D	LINE PLOT	DEC A
10310	4F		LD C, A
10311	CD,3E,26		CALL 9790 PLOT BC
10314	D9		EXX
10315	79		LD A, C
10316	10,D9		DJNZ, 217 (10279) DRAW LINE LOOP
10318	D1		POP DE
10319	C9		RET
10320	28,F3	RANGE	JR Z, 243 (10309) LINE PLOT
10322	CF	ERR B	RST 8 ERROR
10323	0A		B Integer out of range

EXPRESSION EVALUATION

SCANNING SUBROUTINE

10324	DF	EXPRESSION	RST 24 GET CHAR
10325	06,00		LD B, 0
10327	C5		PUSH BC
10328	4F	EXP LOOP	LD C, A
10329	21,4C,29		LD HL, 10572 SCAN FUNCTION TABLE
10332	CD,6B,13		CALL 4971 SEARCH
10335	79		LD A, C
10336	D2,42,2A		JP NC 10818 ALPHA NUM
10339	06,00		LD B, 0
10341	4E		LD C, (HL)
10342	09		ADD HL, BC
10343	E9		JP (HL)

SCANNING QUOTE SUBROUTINE

10344	CD,74,00	CK QUOTE END	CALL 116 UPDATE KEYBOARD
10347	03	FIND LEN	INC BC COUNTER
10348	FE,0D		CP 13 ENTER?
10350	CA,ED,1B		JP Z, 7149 SYN ERR
10353	FE,22		CP 34 "?"
10355	20,FE		JR NZ, 243 (10344) CK QUOTE END
10357	CD,74,00		CALL 116 UPDATE KEYBOARD
10360	FE,22		CP 34 "?" TOO MANY?
10362	C9		RET

SCANNING TWO COORDINATES SUBROUTINE (SCREEN\$, ATTR, POINT)

10363	E7	EXP 2 COORD	RST 32 NEXT CHR
10364	FE,28		CP 40 (?)
10366	20,06		JR NZ, 6 (10374) ERR C
10368	CD,DC,1B		CALL 7132 EXPECT 2 NUMBERS
10371	DF		RST 24 GET CHAR
10372	FE,29		CP 41 (?)
10374	CD,ED,1B	ERR C	CALL 7149 SYN ERR


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SYNTAX SUBROUTINE
10377 FD,CB,01,7E INTERPRET?   BIT 7, (IY+1) CHECK SYNTAX?
10381 C9                        RET

SCREEN POSITION CHARACTER SUBROUTINE
10382 CD,60,26 FIND SCREEN POSN CALL 9824 GET X,Y (STK TO BC)
10385 2A,36,5C                LD HL, (23606) CHAR TABLE
10388 11,00,01                LD DE, 256
10391 19                      ADD HL, DE HL AT BLANK
10392 79                      LD A, C
10393 0F                      RRC A      DIVIDE BY 8
10394 0F                      RRC A
10395 0F                      RRC A
10396 E6,E0                  AND 224  SAVE 3 HIGH BITS
10398 A8                      XOR B
10399 5F                      LD E, A
10400 79                      LD A, C
10401 E6,18                  AND 24   SAVE BITS 3 & 4
10403 EE,40                  XOR 64
10405 57                      LD D, A
10406 06,60                  LD B, 96
10408 C5                      SCREEN LOOP
10409 D5                      PUSH BC COUNT
10410 E5                      PUSH DE SCREEN POINTER
10411 1A                      PUSH HL CHAR SET POINTER
10412 AE                      LD A, (DE)
10413 28,04                  XOR (HL)
10415 3C                      JR Z, 4 (10419) SCREEN MATCH
10416 20,1A                  INC A
10418 3D                      JR NZ, 26 (10444) SCREEN NEXT
10419 4F                      SCREEN MATCH
10420 06,07                  LD C, A
10421 14                      LD B, 7
10423 23                      SCREEN ROWS
10424 1A                      INC D
10425 AE                      INC HL
10426 A9                      LD A, (DE)
10427 20,0F                  XOR (HL)
10429 10,F7                  XOR C
10431 C1                      JR NZ, 15 (10444) SCREEN NEXT
10432 C1                      DJNZ, 247 (10422) SCREEN ROWS
10433 C1                      POP BC DISCARD CHAR SET POINTER
10434 3E,80                  POP BC DISCARD SCREEN POINTER
10436 90                      POP BC COUNT
10437 01,00,00              LD A, 128
10440 F7                      SUB B
10441 12                      LD BC, 1
10442 18,0A                  RST 48 INSERT BC SPACES
10444 E1                      LD (DE), A
10445 11,08,00              JR 10 (10455) FIND ATTR
10558 19                      SCREEN NEXT
10449 D1                      POP HL
10450 C1                      LD DE, 8
10451 10,D3                  ADD HL, DE
10454 C9                      POP DE
                          POP BC
                          DJNZ, 211 (10408) SCREEN LOOP
                          RET

```

FIND ATTRIBUTE ROUTINE

10455	CD,60,26	FIND ATTR	CALL 9824 GET X,Y
10458	79		LD A, C
10459	0F		RRC A DIVIDE BY 8
10460	0F		RRC A
10461	0F		RRC A
10462	4F		LD C, A
10463	E6,60		AND 224 SAVE 3 HIGH BITS
10465	A8		XOR B
10466	6F		LD L, A
10467	79		LD A, C
10468	E6,03		AND 3 SAVE 2 LOW BITS
10470	EE,58		XOR 88 FLIP BITS 3, 4 AND 6
10472	67		LD H, A
10473	7E		LD A, (HL)
10474	C3,E6,30		JP 12518 STK A

PI ROUTINE

10477	CD,89,28	PI	CALL 10377 INTERPRET?
10480	28,03		JR Z, 3 (10485) S-NUMERIC
10482	EF		RST 40 FP CALC
10483	A3		STK PI/2
10484	38		END FP
10485	C3,81,2A	S-NUMERIC	JP 10881 S-NUMERIC

STICK COMMAND ROUTINE

10488	CD,7B,28	STICK	CALL 10363 EXPRESSION 2-COORD
10491	C4,02,29		CALL NZ, 10498 GET 2 EXPRESSIONS
10494	E7		RST 32 NEXT CHAR
10495	C3,81,2A		JP 10881 S NUMERIC
10498	CD,60,26	GET 2 EXPRES	CALL 9824 GET X,Y
10501	78		LD A, B
10502	CD,2B,29		CALL 10539 CK 2
10505	79		LD A, C
10506	CD,2B,29		CALL 10539 CK 2
10509	51		LD D, C
10510	3E,0E		LD A, 14 REG #
10512	D3,F5		OUT (245), A STICK
10514	0E,F6		LD C, 246 PORT #
10516	ED,78		IN A, (C) GET STICK COMMAND
10518	2F		CPL
10519	42		LD B, D
10520	10,0C		DJNZ, 12 (10534) BUTTON?
10522	E6,0F		AND 15 SAVE LOW NIBBLE
10524	FE,0F		CF 15
10526	38,02		JR C, 2 (10530) STACK #
10528	E6,00		AND 0 BIT 0?
10530	CD,E6,30	STACK #	CALL 12518 STK A
10533	C9		RET
10534	07	BUTTON?	RLC A BIT 7?
10535	E6,01		AND 1
10537	18,F7		JR 247 (10530) STACK #
10539	D6,02	CK 2	SUB 2 WHICH STICK?
10541	CE,00		ADC A, 0

10543 20,01		JR NZ, 1 (10546) ERR A
10545 C9		RET
10546 CF	ERR A	RST 8 ERROR
10547 09		A Invalid argument

FREE FUNCTION COMMAND ROUTINE

10548 CD,89,28	FREE	CALL 10377 INTERPRET?
10551 28,0F		JR Z, 15 (10568) GET NEXT CHAR
10553 2A,B2,5C		LD HL, (23730) RAMTOP
10556 ED,5B,65,5C		LD DE, (23653) STK END
10560 A7		AND A CLEAR FLAGS
10561 ED,52		SBC HL, DE
10563 4D		LD C, L
10564 44		LD B, H
10565 CD,E9,30		CALL 12521 STK BC
10568 E7	GET NEXT CHAR	RST 32 NEXT CHAR
10569 C3,81,2A		JP 10881 S-NUMERIC

SCANNING FUNCTION TABLE

10572 22,24	"	(10609)
10574 28,57	((10662)
10576 2E,FA	.	(10827)
10578 2B,1A	+	(10605)
10580 7C,16	STICK	(10603)
10582 7E,12	FREE	(10601)
10584 AB,5A	FN	(10675)
10586 A5,5B	RND	(10678)
10588 A7,88	PI	(10725)
10590 A6,AB	INKEY\$	(10738)
10592 C4,EA	BIN	(10827)
10594 AA,C3	SCREEN\$	(10790)
10596 AB,CB	ATTR	(10800)
10598 A9,D2	POINT	(10809)
10600 00	END MARKER	

SCANNING FUNCTIONS ROUTINES

10601 18,C9	SYN-FREE	JR 201 FREE
10603 18,8B	SYN-STICK	JR 139 STICK
10605 E7	SYN-UNARY+	RST 32 NEXT CHAR
10606 C3,58,28		JP 10328 EXPRESSION
10609 DF	SYN-QUOTE	RST 24 GET CHAR
10610 23		INC HL
10611 E5		PUSH HL
10612 01,00,00		LD BC, 0
10615 CD,68,28		CALL 10344 FIND LENGTH
10618 20,1B		JR NZ, 27 (10647) QUOTE PARAM
10620 CD,68,28	DOUBLE ""	CALL 10344 FIND LENGTH
10623 28,FB		JR Z, 251 (10620) DOUBLE ""
10625 CD,89,28		CALL 10377 INTERPRET?
10628 28,11		JR Z, 17 (10647) QUOTE PARAM
10630 F7		RST 48 INSERT BC SPACES
10631 E1		POP HL
10632 D5		PUSH DE
10633 73	QUOTE COPY	LD A, (HL)
10634 23		INC HL

10635 12		LD (DE), A
10636 13 ---		INC DE
10637 FE, 22		CP 34 "?"
10639 20, F8		JR NZ, 248 (10633) QUOTE COPY
10642 7E		LD A, (HL)
10642 23		INC HL
10643 FE, 22		CP 34 "?"
10645 28, F8		JR NZ, 248 (10633) QUOTE COPY
10647 0B	QUOTE PARAM	DEC BC
10648 D1		POP DE START OF COPIED STRING
10649 21, 3B, 5C	SYN-STRING	JD HL, 23611 AT FLAGS
10652 CB, B6		RES 6, (HL) STRING ON
10654 CB, 7E		BIT 7, (HL) CHECK SYNTAX?
10656 C4, 70, 2E		CALL NZ, 11888 GET STRING PARAM
10659 C3, D0, 2A		JP 10960 S-CONT-2
10662 E7	SYN-BRACKET	RST 32 NEXT CHAR
10663 CD, 54, 28		CALL 10324 EXPRESSION
10666 FE, 29		CP 41)?
10668 C2, ED, 1B		JP NZ, 7149 SYN ERR
10671 E7		RST 32 NEXT CHAR
10672 C3, D0, 2A		JP 10960 S-CONT-2
10675 C3, 7B, 2B		JP 11131 FN
10678 CD, 89, 28	SYN-RND	CALL 10377 INTERPRET?
10681 28, 28		JR Z, 40 (10723) SYN-RND END
10683 ED, 4B, 76, 5C	DO RND	LD BC, (23670) SEED
10687 CD, E9, 30		CALL 12521 STK BC
10690 EF		RST 40 FP CALC
10691 A1		STK 1
10692 0F		ADD
10693 34		STK DATA
10694 37, 16		EXP 87, +16, (+00, +00, +00)
10696 04		MULTIPLY
10697 34		STK DATA
10698 80		4 BYTES WORTH
10699 41, 00, 00, 80		EXP 91, +00, +00, +80, (+00)
10703 32		N MOD M
10704 02		DELETE
10705 A1		STK 1
10706 03		SUBTRACT
10707 31		DUPLICATE
10708 38		END FP
10709 CD, 60, 31		CALL 12640 FP TO BC
10712 ED, 42, 76, 5C		LD (23670), BC SEED
10716 7E		LD A, (HL)
10717 A7		AND A CLEAR FLAGS
10718 28, 03		JR Z, 3 (10723) S-RND-END
10720 D6, 10		SUB 16
10722 77		LD (HL), A
10723 18, 09	S-RND END	JR 9 (10733) PI-END
10725 CD, 89, 28	S-PI	CALL 10377 INTERPRET?
10728 28, 04		JR Z, 4 SKIP RUN
10730 EF	DO PI	RST 40 FP CALC
10731 A3		STK PI/2
10732 38		END
10733 34		INC (HL) EXPONENT INC =X2

10734 E7	S-PI-END	RST 32 NEXT CHAR
10735 C3,81,2A		JP 10881 S NUMERIC
10738 01,5A,10	S-INKEY\$	LD BC 4186 PRIORITY 16/CODE 5A
10741 E7		RST 32 NEXT CHAR
10742 FE,23		CP 35 #?
10744 CA,CB,2A		JP Z, 10955 PUSH PRIORITY
10747 21,3B,5C		LD HL, 13611 FLAGS
10750 CB,7E		RES 6, (HL) STRING ON
10752 CB,7E		BIT 7, (HL) SYNTAX?
10754 28,1F		JR Z, 31 (10787) INKEY\$ END
10756 CD,80,02		CALL 688 K SCAN
10759 0E,00		LD C, 0
10761 20,13		JR NZ, 19 (10782) INKEY\$ STK
10763 CD,5C,03		CALL 860 K-BASE
10766 30,0E		JR NC, 14 (10782) INKEY\$ STK
10768 15		DEC C
10769 5F		LD E, A
10770 CD,71,03		CALL 881 CHAR CODE
10773 F7		PUSH AF
10774 01,01,00		LD BC, 1
10777 F7		RST 48 INSERT BC SPACES
10778 F1		POP AF
10779 12		LD (DE), A
10780 0E,01		LD C, 1
10782 06,00	INKEY\$ STK	LD B, 0
10784 CD,70,2E		CALL 11888 GET STRING PARAM
10787 C3,DO,2A	INKEY\$ END	JP 10960 S-CONT-2
10790 CD,7B,28	SCREEN\$	CALL 10363 SYN 2-COORD
10793 C4,8E,28		CALL NZ, 10382 FIND SCREEN
10796 E7		RST 32 NEXT CHAR
10797 C3,99,29		JP 10649 SYN-STRING
10800 CD,7B,28	ATTR	CALL 10363 EXP-2-COORD
10803 C4,D7,28		CALL NZ, 10455 FIND SCREEN
10806 E7		RST 32 NEXT CHAR
10807 18,48		JR 72 (10881) S NUMERIC
10809 CD,7B,28	POINT	CALL 10363 EXP-2-COORD
10812 C4,24,26		CALL NZ, 9764 FIND POINT
10815 E7		RST 32 NEXT CHAR
10816 18,3F		JR 63 (10881) S NUMERIC
10818 CD,46,30	ALPHA NUM	CALL 12358 ALPHA?
10821 30,56		JR NC, 86 (10909) SYN NEGATE
10823 FE,41		CP 65 A?
10825 30,3C		JR NC, 60 (10887) S-LET #
10827 CD,89,28	S-BIN = S DECIMAL	CALL 10377 INTERPRET?
10830 20,23		JR NZ, 35 (10867) SYN-STK DEC
10832 CD,59,30		CALL 12377 SKT UNSIGNED #
10835 DF		RST 24 GET CHAR
10836 01,06,00		LD BC, 6 SLUG NEEDS 6 SPACES
10839 CD,8B,12		CALL 4795 INSERT BC SPACES
10842 23		INC HL
10843 36,0E		LD (HL), 14 SLUG
10845 23		INC HL
10846 EB		EX DE, HL
10847 2A,65,5C		LD HL, (23653) STK END
10850 0E,05		LD C, 5 GO BACK 5(TO START OF #)

10852 A7		AND A CLEAR FLAGS
10853 ED,42		SBC HL, BC
10855 22,65,5C		LD (23653), HL STK END
10858 ED,B0		LDIR
10860 EB		EX DE, HL
10861 2B		DEC HL
10862 CD,77,00		CALL 119 UPDATE CHAR ADDR
10865 18,0E		JR 14 (10887) SYN-LET #
10867 DF	SYN-STK DEC	RST 24 GET CHAR
10868 23	STK DEC SKIP	INC HL
10869 7E		LD A, (HL)
10870 FE,0E		CP 14 SLUG?
10872 20,FA		JR NZ, 250 (10868) STK DEC SKIP
10874 23		INC HL
10875 CD,73,37		CALL 14195 STK MEM
10878 22,5D,5C		LD (23645), HL CHAR ADDR
10881 FD,CB,01,F6 S-NUMERIC		SET 6, (IY+1) # ON
10885 18,14		NR 20 (10907) CONT-1
SCAN VARIABLE ROUTINE		
10887 CD,70,2C	SYN-LET #	CALL 11376 FIND VARIABLE
10890 DA,91,1B		JP C, 7057 ERR 2
10893 CC,54,2D		CALL Z, 1604 STK VARS
10896 3A,3B,5C		LD A, (23611) FLAGS
10899 FE,C0		CP 192 BIT 6 & 7 = CHAR ARRAY?
10901 38,04		JR C, 4 (10907) CONT-1
10903 23		INC HL
10904 CD,73,37		CALL 14195 STK MEM
10907 18,33	CONT-1	JR 51 (10960) CONT-2
10909 01,DB,09	SYN-NEGATE	LD BC, 09DB(HEX) PRIOR 9/CODE DB
10912 FE,2D		CP 45 "-"? MINUS?
10914 28,27		JR Z, 39 (10955) PUSH PRIORITY
10916 01,18,01		LD BC, 1018(HEX) PRIOR 10/CODE 18
10919 FE,AE		CP 174 VAL\$
10921 28,20		JR Z, 32 (10955) PUSH PRIORITY
10923 D6,AF		SUB 175 REDUCE ALL CODES
10925 DA,ED,1B		JP C, 7149 SYN ERR
10928 01,F0,04		LD BC, 04F0(HEX) PRIOR 4/CODE F0
10931 FE,14		CP 20 NOT?
10933 28,14		JR Z, 20 (10955) PUSH PRIORITY
10935 D2,ED,1B		JP NC, 7149 SYN ERR
10938 06,10		LD B, 16 PRIORITY 16
10940 C6,DC		ADD A, 220 (CODES NOW +45)
10942 4F		LD C, A
10943 FE,DF		CP 223 SIN? (CODE, VAL & LEN)
10945 30,02		JR NC, 2 (10949) # TO STRING
10947 CB,B1		RES 6, C OPER CODE
10949 FE,EE SYN-# TO STRING		CP 238 USR? (STR\$ & CHR\$)
10951 38,02		JR C, 2 (10955) PUSH PRIORITY
10953 CB,B9		RES 7, C OPER CODE
10955 C5	PUSH PRIORITY	PUSH BC
10956 E7		RST 32 NEXT CHAR
10957 C3,58,28		JP 10328 EXP LOOP
10960 DF	S-CONT-2	RST 24 GET CHAR
10961 FE,28	FIND BRACKET	CP 40 (?)

10963 20,0C		JR NZ, 12 (10977) OPERATION
10965 FD,CB,01,76		BIT 6, (IY+1) # ON?
10969 20,17		JR NZ, 23 (10994) S-LOOP
10971 CD,10,2E		CALL 11792 SLICER
10974 E7		RST 32 NEXT CHAR
10975 18,F0		JR 240 (10960) FIND BRACKET
10977 06,00	S-OPERATOR	LD B, 0
10979 4F	SET PRIORITY	LD C, A
10980 21,53,2B		LD HL, 11091 OPERATOR TABLE
10983 CD,6B,1B		CALL 4971 SEARCH
10986 30,06		JR NC, 6 (10994) S-LOOP
10988 4E		LD C, (HL) CODE
10989 21,AB,2A		LD HL, 10923 PRIORITY TABLE OFFST
10992 09		ADD HL, BC
10993 46		LD B, (HL) PRIORITY
10994 D1	S-LOOP	POP DE
10995 7A		LD A, D PRIORITY
10996 B8		CP B WITH LAST?
10997 38,3A		JR C, 58 (11057) S-TIGHTER
10999 A7		AND A CLEAR FLAGS
11000 CA,18,00		JP Z, 24 (0024) GET CHAR
11003 C5		PUSH BC
11004 21,3B,5C		LD HL, 23611 AT FLAGS
11007 7B		LD A, E
11008 FE,ED		CP 237 USR? (STILL +45)
11010 20,06		JR NZ, 6 (11018) STK LAST
11012 CB,76		BIT 6, (HL) # ON?
11014 20,02		JR NZ, 2 (11018) STK LAST
11016 1E,99		LD E, 153 OFFSET FOR LAST CODE
11018 D5	STK LAST	PUSH DE
11019 CD,89,28		CALL 10377 INTERPRET?
11022 28,09		JR Z, 9 (11033) S SYN TEST
11024 7B		LD A, E
11025 E6,3F		AND 63 SAVE 5 LOW BITS
11027 47		LD B, A
11028 EF		RST 40 FP CALC
11029 3B		FP CALC 2
11030 38		END FP
11031 18,09		JR 9 (11042) S RUN TEST
11033 7B	S SYN TEST	LD A, E
11034 FD,AE,01		XOR (IY+1) FLAGS
11037 E6,40		AND 64 TOKEN?
11039 C2,ED,18	ERR C	JP NZ, 7149 SYN ERR
11042 D1	S RUN TEST	POP DE
11043 21,3B,5C		LD HL, 23611 AT FLAGS
11046 CB,F6		SET 6, (HL) # ON
11048 CB,7B		BIT 7, E
11050 20,02		JR NZ, 2 (11054) END LOOP
11052 CB,B6		RES 6, (HL) STRING ON
11054 C1	S END LOOP	POP BC
11055 18,C1		JR 193 (10994) S LOOP
11057 D5	S-TIGHTER	PUSH DE
11058 79		LD A, C
11059 FD,CB,01,76		BIT 6, (IY+1) # ON?
11063 20,15		JR NZ, 21 (11086) S-NEXT

11065 E6, 3F
 11067 C6, 08
 11069 4F
 11070 FE, 10
 11072 20, 04
 11074 CB, F1
 11076 18, 08
 11078 38, D7
 11080 FE, 17
 11082 28, 02
 11084 CB, F9
 11086 C5
 11087 E7
 11088 C3, 58, 28

NOT AND

S-NEXT

AND 63 CLEAR BITS 6 & 7
 ADD A, 8 INCREASE CODE BY 8
 LD C, A
 CP 16 AND?
 JR NZ, 4 (11078) NOT AND
 SET 6, C NEED # ON
 JR 8 (11086) S-NEXT
 JR C, 215 (11039) ERR C
 CP 23 "+"?
 JR Z, 2 (11086) S-NEXT
 SET 7, C # ON
 PUSH BC
 RST 32 NEXT CHAR
 JP 10328 EXP LOOP

TABLE OF OPERATORS

11091 2B, CF
 11093 2D, C3
 11095 2A, C4
 11097 2F, C5
 11099 5E, C6
 11101 3D, CE
 11103 3E, CC
 11105 3C, CD
 11107 C7, C9
 11109 C8, CA
 11111 C9, CB
 11113 C5, C7
 11115 C6, C8
 11117 00

+	CODE CF
-	C3
*	C4
/	C5
^	C6
=	CE
>	CC
<	CD
<=	C9
>=	CA
<>	CB
OR	C7
AND	C8
END MARKER	

TABLE OF PRIORITIES

11118 C3
 11119 C4
 11120 C5
 11121 C6
 11122 C7
 11123 C8
 11124 C9
 11125 CA
 11126 CB
 11127 CC
 11128 CD
 11129 CE
 11130 CF

	PRIORITY
-	6
*	8
/	8
^	10
OR	2
AND	3
<=	5
>=	5
<>	5
>	5
<	5
=	5
+	6

SCAN FOR FUNCTION SUBROUTINE

11131 CD, 89, 28
 11134 20, 35
 11136 E7
 11137 CD, 4B, 30
 11140 D2, ED, 1B
 11143 E7
 11144 FE, 24
 11146 F5

FN

CALL 10377 INTERPRET?
 JR NZ, 53 (11189) S-RUN FN
 RST 32 NEXT CHAR
 CALL 12363 ALPHA?
 JR NC, 7149 SYN ERR
 RST 32 NEXT CHAR
 CP 36 \$?
 RST 32 NEXT CHAR

11147 20,01		JR NZ, 1 (11150) BRACKET?
11149 E7		RST 32 NEXT CHAR
11150 FE,28	BRACKET?	CP 40 (?)
11152 20,12		JR NZ, 18 (11172) SYN ERR
11154 E7		RST 32 NEXT CHAR
11155 FE,29		CP 41)?
11157 28,01		JR Z, 16 (11175) FN-FLAGS 6
11159 CD,54,28	FN-ARGUMENTS	CALL 10324 EXPRESSION
11162 DF		RST 24 GET CHAR
11163 FE,2C		CP 44 ", "?
11165 20,03		JR NZ, 3 (11170) BRACKET-2?
11167 E7		RST 32 NEXT CHAR
11168 18,F5		JR 245 (11159) FN ARGUMENTS
11170 FE,29	BRACKET-2?	CP 41)?
11172 C2,ED,1B	SYN ERR	JP NZ, 7149 SYN ERR
11175 E7	FN-FLAGS 6	RST 32 NEXT CHAR
11176 21,3B,5C		LD HL, 23611 AT FLAGS
11179 CB,B6		RES 6, (HL) ASSUME STRING
11181 F1		POP AF
11182 28,02		JR Z, 2 (11186) SYN-FN-END
11184 CB,F6		SET 6, (HL) # ON
11186 C3,D0,2A	SYN-FN-END	JP 10960 S-CONT-2
11189 E7	SYN RUN FN	RST 32 NEXT CHAR
11190 E6,DF		AND 223 UPPER CASE
11192 47		LD B, A
11193 E7		RST 32 NEXT CHAR
11194 D6,24		SUB 36 CODE FOR \$
11196 4F		LD C, A
11197 20,01		JR NZ, 1 (11200) ARGUMENT-1
11199 E7		RST 32 NEXT CHAR
11200 E7	ARGUMENT-1	RST 32 NEXT CHAR
11201 E5		PUSH HL
11202 2A,53,5C		LD HL, (23635) PROGRAM
11205 2B		DEC HL
11206 11,CE,00	FIND DEF FN	LD DE, 206 DEF FN
11209 C5		PUSH BC
11210 CD,28,1D		CALL 7464 SKIP (LOOK PROG)
11213 C1		POP BC RESTORE NAME AND STATUS
11214 30,02		JR NC, 2 (11218) COMPARE DEF FN
11216 CF	ERR P	RST 8 ERROR
11217 18		P FN without DEF
11218 E5	COMPARE DEF FN	PUSH HL
11219 CD,69,2C		CALL 11369 NXT-HL(SKIP OVER)
11222 E6,DF		AND 223 CLEAR BIT 5
11224 B8		CP B
11225 20,08		JR NZ, 8 (11235) FN-NOT FOUND
11227 CD,69,2C		CALL 11369 NEXT-HL(SKIP OVER)
11230 D6,24		SUB 36 CODE FOR \$
11232 B9		CP C
11233 28,0C		JR Z, 12 (11247) FN VALUES
11235 E1	FN NOT FOUND	POP HL
11236 2B		DEC HL
11237 11,00,02		LD DE, 512
11240 C5		PUSH BC SAVE NAME AND STATUS
11241 CD,F3,16		CALL 5875 SUB LINE 1

11244 C1		POP BC
11245 18,D7		JR 215 (11205) FIND DEF FN
11247 A7	FN VALUES	AND A CLEAR FLAGS
11248 CC,69,2C		CALL Z, 11369 NEXT-HL(SKIP OVER)
11251 D1		POP DE DISCARD POINTER TO DEF FN
11252 D1		POP DE 1ST ARG OF FN
11253 ED,53,5D,5C		LD (23645), DE CHAR ADDR
11257 CD,69,2C		CALL 11369 NEXT-HL(SKIP OVER)
11260 E5		PUSH HL
11261 FE,29		CP 41)?
11263 28,42		JR Z, 66 (11331) REP BRACKET-2
11265 23	FN-ARG LOOP	INC HL
11266 7E		LD A, (HL)
11267 FE,0E		CP 14 SLUG?
11269 16,40		LD D, 64
11271 28,07		JR NZ, 7 (11280) FN ARG VALUE
11273 2B		DEC HL
11274 CD,69,2C		CALL 11269 NEXT-HL(SKIP OVER)
11277 23		INC HL
11278 16,00		LD D, 0
11280 23	FN ARG VALUE	INC HL
11281 E5		PUSH HL
11282 D5		PUSH DE
11283 CD,54,28		CALL 10324 EXPRESSION
11286 F1		POP AF
11287 FD,AE,01		XOR (IY+1)
11290 E6,40		AND 64 # ON?
11292 20,2B		JR NZ, 43 (11337) ERR Q
11294 E1		POP HL
11295 EB		EX DE, HL
11296 2A,65,5C		LD HL, (23653) STK END
11299 01,05,00		LD BC, 5 BACK UP 5
11302 ED,42		SBC HL, BC
11304 22,65,5C		LD (23653), HL STK END
11307 ED,B0		LDIR
11309 EB		EX DE, HL
11310 2B		DEC HL
11311 CD,69,2C		CALL 11369 NEXT HL(SKIP OVER)
11314 FE,29		CP 41)?
11316 28,0D		JR Z, 13 (11331) FN REP BRACKET-2
11318 E5		PUSH HL
11319 D5		RST 24 GET CHAR
11320 FE,2C		CP 44 ", "?
11322 20,0D		JR NZ, 13 (11337) ERR Q
11324 E7		RST 32 NEXT CHAR
11325 E1		POP HL
11326 CD,69,2C		CALL 11369 NEXT HL(SKIP OVER)
11329 18,BE		JR 190 (11263) FN ARG LOOP
11331 E5	FN REP BRACKET-2	PUSH HL
11332 DF		RST 24 GET CHAR
11333 FE,29		CP 41)?
11335 28,02		JR Z, 2 (11339) FN VALUE
11337 CF	ERR Q	RST 8 ERROR
11338 18		Q Parameter error
11339 D1	FN VALUE	POP DE

11340 EB
 11341 22,5D,5C
 11344 2A,0B,5C
 11347 E3
 11348 22,0B,5C
 11351 D5
 11352 E7
 11353 E7
 11354 CD,54,28
 11357 E1
 11358 22,5D,5C
 11361 E1
 11362 22,0B,5C
 11365 E7
 11366 C3,D0,2A

EX DE, HL
 LD (23645), HL CHAR ADDR
 LD HL, (23563) DEF ADDR
 EX (SP), HL
 LD (23563), HL DEF ADDR
 PUSH DE
 RST 32 NEXT CHAR
 RST 32 NEXT CHAR
 CALL 10324 EXPRESSION
 POP HL
 LD (23645), HL CHAR ADDR
 POP HL
 LD (23563) HL DEF ADDR
 RST 32 NEXT CHAR
 JP 10960 S-CONT-2

FUNCTION SKIPOVER SUBROUTINE

11369 23 NEXT HL(SKIP OVER)
 11370 7E
 11371 FE,21
 11373 38,FA
 11375 C9

INC HL
 LD A, (HL)
 CP 33 !?
 JR C, 250 (11369) NEXT HL(SKIP
 RET OVER)

LOOK IN VARS SUBROUTINE

11376 FD,CB,01,F6 FIND N(LOOK VARS) SET 6, (IY+1) ASSUME #
 11380 DF
 11381 CD,4B,30
 11384 D2,ED,1B
 11387 E5
 11388 E6,1F
 11390 4F
 11391 E7
 11392 E5
 11393 FE,28
 11395 28,28
 11397 CB,F1
 11399 FE,24
 11401 28,11
 11403 CB,F1
 11405 CD,46,30
 11408 30,0F
 11410 CD,46,30 V-CHAR
 11413 30,16
 11415 CB,F1
 11417 E7
 11418 18,F6
 11420 E7 V-STR-VAR
 11421 FD,CB,01,B6
 11425 3A,0C,5C V-TEST FN
 11428 A7
 11429 28,06
 11431 CD,89,28
 11434 C2,0F,2D
 11437 41 V-RUN/SYN
 11438 CD,89,28

RST 24 GET CHAR
 CALL 12363 ALPHA?
 JP NC, 7149 SYN ERR
 PUSH HL
 AND 31 SAVE 5 LOW BITS
 LD C, A SAVE 1ST LETTER NAME
 RST 32 NEXT CHAR
 PUSH HL
 CP 40 ?
 JR Z, 40 (11437) V-RUN/SYN
 SET 6, C SINGLE LETTER VARIABLE
 CP 36 \$? STRING?
 JR Z, 17 (11420) V-STR-VAR
 SET 5, C NUMERIC VARIABLE
 CALL 12358 ALPHA?
 JR NC, 15 (11425) V-TEST FN
 CALL 12358 ALPHA?
 JR NC, 22 (11437) V-STR-VAR
 RES 6, C LONG NAME VAR/ARRAY
 RST 32 NEXT CHAR
 JR 246 (11410) V-CHAR
 RST 32 NEXT CHAR
 RES 6, (IY+1) STRING ON
 LD A, (23564) DEF ADDR
 AND A CLEAR FLAGS
 JR Z, 6 (11437) V-RUN/SYN
 CALL 10377 INTERPRET?
 JP NZ, 11535 STK FN ARGUMENT
 LD B, C
 CALL 10377 INTERPRET?

11441 20,08		JR NZ, 8 (11451) V RUN
11443 79		LD A, C
11444 E6,E0		AND 224 DROP CHAR CODE
11446 CB,FF		SET 7, A ARRAY/FOR VAR
11448 4F		LD C, A
11449 18,37		JR 55 (11506) V-SYNTAX
11451 2A,4B,5C	V-RUN	LD HL, (23627) VARS
11454 7E	V-EACH	LD A, (HL) 1ST LETTER
11455 E6,7F		AND 127 CLEAR BIT 7
11457 28,2D		JR Z, 45 (11504) V-BIT 7
11459 B9		CP C
11460 20,22		JR NZ, 34 (11496) V NEXT
11462 17		RL A TEST BIT 7
11463 87		ADD A, A
11464 F2,FD,2C		JP P 11517 V FOUND-2
11467 38,30		JR C, 48 (11517) V FOUND-2
11469 D1		POP DE
11470 D5		PUSH DE
11471 E5		PUSH HL
11472 23	V-MATCHES	INC HL
11473 1A	V-SPACES	LD A, (DE)
11474 13		INC DE
11475 FE,20		CP 32 SPACE?
11477 28,FA		JR Z, 250 (11473) V-SPACES
11479 F6,20		OR 32 MATCH LOWER CASE?
11481 BE		CP (HL)
11482 28,F4		JR Z, 244 (11472) V-MATCHES
11484 F6,80		OR 128 SET BIT 7
11486 BE		CP (HL)
11487 20,06		JR NZ, V-GET POINTER
11489 1A		LD A, (DE)
11490 CD,46,30		CALL 12358 ALPHA NUM?
11493 30,15		JR NC, 21 (11516) V-FOUND-1
11495 E1	V-GET POINTER	POP HL GET POINTER
11496 C5	V-NEXT	PUSH BC
11497 CD,20,17		CALL 5920 RECORD LENGTH
11500 EB		EX DE, HL
11501 C1		POP BC
11502 18,CE		JR 206 (11454) V-EACH
11504 CB,F8	V-BIT 7	SET 7, B NO VAR FOUND
11506 D1	V-SYNTAX	POP DE
11507 DF		RST 24 GET CHAR
11508 FE,28		CP 40 (?)
11510 28,09		JR Z, 9 (11521) V PASS
11512 CB,E8		SET 5, B NO ARRAY
11514 18,0D		JR 13 (11529) V-END
11516 D1	V-FOUND-1	POP DE DROP VAR POINTER
11517 D1	V-FOUND-2	POP DE DROP 2ND CHAR POINTER
11518 D1		POP DE 1ST LETTER POINTER
11519 E5		PUSH HL SAVE LAST LETTER POINTER
11520 DF		RST 24 GET CHAR
11521 CD,46,30	V-PASS	CALL 12358 ALNUM?
11524 30,03		JR NC, 3 (11529) V-END
11526 E7		RST 32 NEXT CHAR
11527 18,F8		JR 248 (11521) V-PASS


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11529 E1          V-END      POP HL
11530 CB,01       RL B
11532 CB,70       BIT 6, B
11534 C9          RET

```

STACK FUNCTION ARGUMENT SUBROUTINE

```

11535 2A,0B,5C   STK FN ARG   LD HL, (23563) DEF ADDR
11538 7E          LD A, (HL)
11539 FE,29      CP 41 )?
11541 CA,AD,2C   JP Z, 11437 V-RUN/SYN
11544 7E          SFA LOOP    LD A, (HL)
11545 F6,60      OR 96        SET BITS 5 & 6
11547 47          LD B, A
11548 23          INC HL
11549 7E          LD A, (HL)
11550 FE,0E      CP 14 SLUG?
11552 28,07      JR Z, 7 (11561) SFA COMPARE VARS
11554 2B          DEC HL
11555 CD,69,2C   CALL 11369 NEXT HL (SKIP OVER)
11558 23          INC HL
11559 CB,A8      RES 5, B     NOT STRING/ARRAY
11561 78          SFA COMPARE VARS LD A, B
11562 B9          CP C
11563 28,12      JR Z, 18 (11583) SFA MATCH
11565 23          INC HL     SKIP #
11566 23          INC HL
11567 23          INC HL
11568 23          INC HL
11569 23          INC HL
11570 CD,69,2C   CALL 11369 NEXT HL (SKIP OVER)
11573 FE,29      CP 41 )?
11575 CA,AD,2C   JP Z, 11437 V RUN/SYN
11578 CD,69,2C   CALL 11369 NEXT HL (SKIP OVER)
11581 18,D9      JR 217 (11544) SFA LOOP
11583 CB,69      SFA MATCH    BIT 5, C     NUMERIC VAR?
11585 20,0C      JR NZ, 12 (11599) SFA END
11587 23          INC HL
11588 ED,5B,65,5C LD DE, (23653) STK END
11592 CD,7F,37   CALL 14207 DUPLICATE
11595 EB          EX DE, HL
11596 22,65,5C   LD (23653) HL STK END
11599 D1          SFA END     POP DE DISCARD 2ND CHAR POINTER
11600 D1          POP DE DISCARD 1ST CHAR POINTER
11601 AF          XOR A     CLEAR A & CARRY
11602 3C          INC A     CLEAR ZERO FLAG
11603 C9          RET

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STACK VARS SUBROUTINE

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11604 AF          STK VAR     XOR A     CLEAR A & CARRY
11605 47          LD B, A     CLEAR B
11606 CB,79      BIT 7, C     SYNTAX CHECK ?
11608 20,4B      JR NZ, 75 (11685) SV-COUNT
11610 CB,7E      BIT 7, (HL) ARRAY/FOR?
11612 20,0E      JR NZ, 14 (11628) SV ARRAYS
11614 3C          INC A

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11615 23	SV SIMPLE \$	INC HL	LENGTH TO BC
11616 4E		LD C, (HL)	
11617 23		INC HL	
11618 46		LD B, (HL)	
11619 23		INC HL	
11620 EB		EX DE, HL	
11621 CD,70,2E		CALL 11888	GET STRING PARAMETERS
11624 DF		RST 24	GET CHAR
11625 C3,07,2E		JP 11783	SV SLICE?
11628 23	SV ARRAY	INC HL	SKIP LENGTH
11629 23		INC HL	
11630 23		INC HL	
11631 46		LD B, (HL)	
11632 CB,71		BIT 6, C	ARRAY?
11634 28,0A		JR Z, 15 (11646)	SV POINTER
11636 05		DEC B	
11637 28,EB		JR Z, 232 (11615)	SV SIMPLE \$
11639 EB		EX DE, HL	
11640 DF		RST 24	GET CHAR
11641 FE,28		CP 40 (?)	
11643 20,61		JR NZ, 97 (11742)	ERR 3
11645 EB		EX DE, HL	
11646 EB	SV POINTER	EX DE, HL	
11647 18,24		JR 36 (11685)	SV COUNT
11649 E5	SV COMMA	PUSH HL	
11650 DF		RST 24	GET CHAR
11651 E1		POP HL	
11652 FE,C2		CP 44 ", "?	
11654 28,20		JR Z, 32 (11688)	SV LOOP
11656 CB,79		BIT 7, C	EXECUTE?
11658 28,52		JR Z, 82 (11742)	ERR 3
11660 CB,71		BIT 6, C	STRING ARRAY?
11662 20,06		JR NZ, 6 (11670)	SV-CLOSE
11664 FE,29		CP 41)?	
11666 20,3C		JR NZ, 60 (11728)	ERR C
11668 E7		RST 32	NEXT CHAR
11669 C9		RET	
11670 FE,29	SV CLOSE	CP 41)?	
11672 28,6C		JR Z, 108 (11782)	SV DIM
11674 FE,CC		CP 204	T0?
11676 20,32		JR NZ, 50 (11728)	ERR C
11678 DF	SV CHAR ADDR	RST 24	GET CHAR
11679 2B		DEC HL	
11680 22,5D,5C		LD (23645), HL	CHAR ADDR
11683 18,5E		JR 94 (11783)	SV SLICE
11685 21,00,00	SV COUNT	LD HL, 0	
11688 E5	SV LOOP	PUSH HL	
11689 E7		RST 32	NEXT CHAR
11690 E1		POP HL	
11691 79		LD A, C	
11692 FE,C0		CP 192	SYN ARRAY STR
11694 20,09		JR NZ, 9 (11705)	SV MULT
11696 DF		RST 24	GET CHAR
11697 FE,29		CP 41)?	
11699 28,51		JR Z, 81 (11782)	SV DIM

11701 FE,CC		CP 204 TO?
11703 28,E5		JR Z, 229 (11678) CHAR ADDR
11705 C5	SV MULT	PUSH BC
11706 E5		PUSH HL
11707 CD,AC,2E		CALL 11948 LD DE
11710 E3		EX (SF), HL
11711 EB		EX DE, HL
11712 CD,8A,2E		CALL 11914 INT EXP-1
11715 38,19		JR C, 25 (11742) ERR 3
11717 0B		DEC BC
11718 CD,B2,2E		CALL 11954 GET HL*DE
11721 09		ADD HL, BC
11722 D1		POP DE
11723 C1		POP BC
11724 10,B3		DJNZ, 179 (11649) SV COMMA
11726 CB,79		BIT 7, C CK SYNTAX?
11728 20,66	ERR C	JR NZ, 102 (11832) ERR C
11730 E5		PUSH HL
11731 CB,71		BIT 6, C STRING ARRAY?
11733 20,13		JR NZ, 19 (1754) SV ELEM \$
11735 42		LD B, D
11736 4B		LD C, E
11737 DF		RST 24 GET CHAR
11738 FE,29		CP 41)?
11740 28,02		JR Z, 2 (11744) SV #
11742 CF	ERR 3	RST 8 ERROR
11743 02		3 Subscript out of range
11744 E7	SV #	RST 32 NEXT CHAR
11745 E1		POP HL
11746 11,05,00		LD DE, 5 SLUG NEEDS 5 SPACES
11749 CD,B2,3E		CALL 11954 GET HL*DE
11752 09		ADD HL, BC
11753 C9		RET
11754 CD,AC,2C	SV ELEM \$	CALL 11948 LD DE
11757 E3		EX (SF), HL
11758 CD,B2,2E		CALL 11954 GET HL*DE
11761 C1		POP BC
11762 09		ADD HL, BC
11763 23		INC HL
11764 42		LD B, D
11765 4B		LD C, E
11766 EB		EX DE, HL
11767 CD,6F,2E		CALL 11887 STK ST 0
11770 DF		RST 24 GET CHAR
11771 FE,29		CP 41)?
11773 28,07		JR Z, 7 (11782) SV DIM
11775 FE,2C		CP 44 ", "?
11777 20,DB		JR NZ, 219 (11742) ERR 3
11779 CD,10,2E	SV SLICE	CALL 11792 SLICER
11782 E7	SV DIM	RST 32 NEXT CHAR
11783 FE,28	SV SLICE?	CP 40 (?)
11785 28,F8		JR Z, 248 (11779) SV SLICE
11787 FD,CB,01,B6		RES 6, (IY+1) STRING ON
11791 C9		RET

SLICING SUBROUTINE

11792 CD,89,28	SLICER	CALL 10377 INTERPRET?
11795 C4,AF,2F		CALL NZ, 12207 GET STRING PARAM
11798 E7		RST 32 NEXT CHAR
11799 FE,29		CP 41)?
11801 28,50		JR Z, 80 (11883) SL STORE
11803 D5		PUSH DE START
11804 AF		XOR A CLEAR A & CARRY
11805 F5		PUSH AF
11806 C5		PUSH BC LENGTH
11807 11,01,00		LD DE, 1
11810 DF		RST 24 GET CHAR
11811 E1		POP HL LENGTH IN HL
11812 FE,CC		CP 204 TO?
11814 28,17		JR Z, 23 (11839) SL-2ND
11816 F1		POP AF
11817 CD,8B,2E		CALL 11915 INT EXP-2
11820 F5		PUSH AF
11821 50		LD D, B
11822 59		LD E, C
11823 E5		PUSH HL SAVE LENGTH
11824 DF		RST 24 GET CHAR
11825 E1		POP HL
11826 FE,CC		CP 204 TO?
11828 28,09		JR Z, 9 (11839) SL-2ND
11830 FE,29		CP 41)?
11832 C2,ED,1B	ERR C	JP NZ, 7149 SYN ERR
11835 62		LD H, D SLICE OF 1
11836 6B		LD L, E
11837 18,13		JR 19, (11858) SL DEFINE
11839 E5	SL 2ND	PUSH HL
11840 E7		RST 32 NEXT CHAR
11841 E1		POP HL
11842 FE,29		CP 41)?
11844 28,0C		JR Z, 12 (11858) SL DEFINE
11846 F1		POP AF
11847 CD,8B,2E		CALL 11915 INT EXP-2
11850 F5		PUSH AF
11851 DF		RST 24 GET CHAR
11852 60		LD H, B
11853 69		LD L, C
11854 CP,29		CP 41)?
11856 20,E6		JR NZ, 230 (11832) ERR C
11858 F1	SL DEFINE	POP AF
11859 E3		EX (SP), HL
11860 19		ADD HL, DE
11861 2B		DEC HL
11862 E3		EX (SP), HL
11863 A7		AND A CLEAR FLAGS
11864 ED,52		SBC HL, DE
11866 01,00,00		LD BC, 0
11869 38,07		JR C, 7 (11878) SL-OVER
11871 23		INC HL
11872 A7		AND A CLEAR FLAGS
11873 FA,DE,2D		JP N, 11743 ERR 3

11876 44		LD B, H	NEW LENGTH TO BC
11877 4D		LD C, L	
11878 D1	SL OVER	POP DE	
11879 FD, CB, 01, B6		RES 6, (IY+1) STRING ON	
11883 CD, 89, 28	SL STORE	CALL 10377 INTERPRET?	
11886 C8		RET Z	
STACK STORE SUBROUTINE			
11887 AF	STK ST 0	XOR A CLEAR A & CARRY	
11888 FD, CB, 01, B6		RES 6, (IY+1) STRING ON	
11892 C5	PUT AEDCB	PUSH BC	
11893 CD, 68, 37		CALL 14184 TEST 5 SPACE	
11896 C1		POP BC	
11897 2A, 65, 5C		LD HL, (23653) STK END	
11900 77		LD (HL), A ARRAY FLAG/EXP #	
11901 23		INC HL	
11902 73		LD (HL), E LOW ADDR/HIGH BYTE	
11903 23		INC HL	
11904 72		LD (HL), D HIGH ADDR/2ND BYTE	
11905 23		INC HL	
11906 71		LD (HL), C LOW LEN/3RD BYTE	
11907 23		INC HL	
11908 70		LD (HL), B HIGH LEN/LAST BYTE	
11909 23		INC HL	
11910 22, 65, 5C		LD (23653), HL STK END	
11913 C9		RET	
INT EXP SUBROUTINE			
11914 AF	INT EXP-1	XOR A CLEAR ERROR REGISTER	
11915 D5	INT EXP-2	PUSH DE SAVE REGISTERS	
11916 E5		PUSH HL	
11917 F5		PUSH AF	
11918 CD, E5, 1B		CALL 7141 TEM 6(EXPECT 1 #)	
11921 F1		POP AF ERROR FLAG	
11922 CD, 89, 28		CALL 10377 INTERPRET?	
11925 28, 12		JR Z, 18 (11945) I-RESTORE	
11927 E5		PUSH AF	
11928 CD, 23, 1F		CALL 7971 FIX-U (GET INT)	
11931 D1		POP DE	
11932 78		LD A, B	
11933 B1		OR C BC= 0?	
11934 37		SCF	
11935 28, 05		JR Z, 5 (11942) I-CARRY	
11937 E1		POP HL COPY LIMIT/DIM SIZE	
11938 E5		PUSH HL	
11939 A7		AND A CLEAR FLAGS	
11940 ED, 42		SBC HL, DE	
11942 7A	I-CARRY	LD A, D	
11943 DE, 00		SBC A, A	
11945 E1	I-RESTORE	POP HL	
11946 D1		POP DE	
11947 C9		RET	
LD DE SUBROUTINE			
11948 EB	LD DE	EX DE, HL	

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11949 23      INC HL
11950 5E      LD E, (HL)
11951 23      INC HL
11952 56      LD D, (HL)
11953 C9      RET

GET HL*DE SUBROUTINE
11954 CD,89,28  GET HL*DE  CALL 10377 INTERPRET?
11957 C8      RET Z
11958 CD,68,38  CALL 13416 MULTIPLY
11961 DA,CF,1F  JP C, 8143  ERR 4
11964 C9      RET

LET COMMAND ROUTINE
11965 2A,4D,5C      LET  LD HL, (23629) DESTination
11968 FD,CB,37,4E    BIT 1, (IY+55) VARIABLE FOUND?
11972 28,5E          JR Z, 94 (12068) L EXITS
11974 01,05,00      LD BC, 5  # NEEDS 5 SPACES
11977 03      EACH CHAR  INC BC  ADD 1 EACH CHAR OF NAME
11978 23      # SPACE    INC HL
11979 7E      LD A, (HL)
11980 FE,20      CP 32 SPACE?
11982 28,FA      JR NZ, 250 (11978) # SPACE
11984 30,0B      JR NC, 11 (11997) TEST CHAR
11986 FE,10      CP 16 CONTROL CHAR?
11988 38,11      JR C, 17 (12007) SPACES
11990 FE,16      CP 22
11992 30,0D      JR NC, 13 (12007) SPACES
11994 23      INC HL
11995 18,ED      JR 237 (11978) # SPACE
11997 CD,46,30    TEST CHAR  CALL 12368 ALPHANUM?
12000 38,E7      JR C, 231 (11977) EACH CHAR
12002 FE,24      CP 36 $?
12004 CA,7E,2F    JP Z, 12158 NEW $
12007 79      SPACES      LD A, C  LENGTH TO A
12008 2A,59,5C    LD HL, (23641) E LINE
12011 2B      DEC DE
12012 CD,BB,12    CALL 4795 INSERT BC SPACES
12015 23      INC HL  GET TO 1ST NEW BYTE
12016 23      INC HL
12017 EB      EX DE, HL
12018 D5      PUSH HL
12019 2A,4D,5C    LD HL, (23629) DESTINATION
12022 1B      DEC DE
12023 D6,06      SUB A, 6 (GIVES NAME LENGTH)
12025 47      LD B, A  NAME LEN TO B
12026 28,11      JR Z, 17 (12045) L SINGLE
12028 23      L CHAR      INC HL  FIND 1ST SPACE
12029 7E      LD A, (HL)  (END OF NAME)
12030 FE,21      CP 33 !?
12032 38,FA      JR C, 250 (12028) L CHAR
12034 F6,20      OR 32  MAKE UPPER CASE
12036 13      INC DE
12037 12      LD (DE), A
12038 10,F4      DJNZ, 244 (12028) L CHAR

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12040 F6,80		OR 128 PREP MARK LAST LETTER
12042 12		LD (DE), A
12043 3E,C0		LD A, 192 PREP MARK 1ST LETTER
12045 2A,4D,5C	L SINGLE	LD HL, (23629) DEST
12048 AE		XOR (HL)
12049 F6,20		OR 32 MAKE UPPER CASE
12051 E1		POP HL
12052 CD,A8,2F		CALL 12200 L FIRST
12055 E5	L NUMERIC	PUSH HL
12056 EF		RST 40 FP CALC
12057 02		DELETE
12058 38		END FP
12059 E1		POP HL
12060 01,05,00		LD BC, 5
12063 A7		AND A CLEAR FLAGS
12064 ED,42		SBC HL, BC
12066 18,40		JR 64 (12132) L ENTER
12068 FD,CB,01,76	L EXITS	BIT 6, (IY+1) # ON?
12072 28,06		JR Z, 6 (12080) L DELETE \$
12074 11,06,00		LD DE, 6 6 BYTES FOR #
12077 19		ADD HL, DE
12078 18,E7		JR 231 (12055) L NUMERIC
12080 2A,4D,5C	L DELETE \$	LD HL, (23629) DEST
12083 ED,4B,72,5C		LD BC, (23666) STR LEN
12087 FD,CB,37,46		BIT 0, (IY+55) SIMPLE \$?
12091 20,30		JR NZ, 48 (12141) L ADD \$
12093 78		LD A, B
12094 B1		OR C BC = 0?
12095 C8		RET Z (EMPTY)
12096 E5		PUSH HL
12097 F7		RST 48 INSERT BC SPACES
12098 D5		PUSH DE
12099 C5		PUSH BC
12100 54		LD D, H
12101 5D		LD E, L
12102 23		INC HL
12103 36,20		LD (HL), 32 SPACE
12105 ED,B8		LDDR
12107 E5		PUSH HL
12108 CD,AF,2F		CALL 12207 GET PARAMETERS
12111 E1		POP HL
12112 E3		EX (SP), HL
12113 A7		AND A CLEAR FLAGS
12114 ED,42		SBC HL, BC FIND DIFFERENCE
12116 09		ADD HL, BC ADD ABCK
12117 30,02		JR NC, 2 (12121) L LENGTH
12119 44		LD B, H
12120 4D		LD C, L
12121 E3	L LENGTH	EX (SP), HL
12122 EB		EX DE, HL
12123 78		LD A, B
12124 B1		OR C BC= 0?
12125 28,02		JR Z, 2 (12129) L IN WRITE SEQ
12127 ED,B0		LDIR
12129 C1	L IN WRITE SEQ	POP BC

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12130 D1      POP DE
12131 E1      POP HL

```

LET ENTER SUBROUTINE

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12132 EB      L ENTER      EX DE, HL
12133 78      LD A, B
12134 B1      OR C          BC = 0?
12135 C8      RET Z (EMPTY)
12136 D5      PUSH DE
12137 ED, B0   LDIR
12139 E1      POP HL
12140 C9      RET

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LET SUBROUTINE CONTINUED

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12141 2B      L ADD $      DEC HL
12142 2B      DEC HL
12143 2B      DEC HL
12144 7E      LD A, (HL) 1ST LETTER OF NAME
12145 E5      PUSH HL
12146 C5      PUSH BC
12147 CD, 84, 2F CALL 12164 L STRING
12150 C1      POP BC
12151 E1      POP HL
12152 02      INC BC
12153 02      INC BC
12154 02      INC BC STEP OVER LETTER & LEN
12155 C3, 50, 17 JP 5968 DELETE RECORD
12158 3E, DF   L NEW $    LD A, 223 PREP TO MARK NAME
12160 2A, 4D, 5C LD HL, (23629) DEST
12163 A6      AND (HL)

```

LET STRING SUBROUTINE

```

12164 F5      L STRING    PUSH AF
12165 CD, AF, 2F CALL 12207 GET PARAMETERS
12168 EB      EX HL, DE
12169 09      ADD HL, BC
12170 C5      PUSH BC
12171 2B      DEC HL
12172 22, 4D, 5C LD (23629), HL UPDATE DEST
12175 03      INC BC SKIP LETTER & LENGTH
12176 03      INC BC
12177 03      INC BC
12178 2A, 59, 5C LD HL, (23641) E LINE
12181 2B      DEC HL
12182 CD, BB, 12 CALL 4795 INSERT BC SPACES
12185 2A, 4D, 5C LD HL, (23629) DEST
12188 C1      POP BC
12189 C5      PUSH BC
12190 03      INC BC
12191 ED, B8     LDDR
12193 EB      EX DE, HL
12194 23      INC HL
12195 C1      POP BC
12196 70      LD (HL), B INSERT LEN
12197 2B      DEC HL

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12198 71                                LD (HL), C
12199 F1                                POP AF

LET FIRST SUBROUTINE
12200 2B                                L FIRST      DEC HL AT OLD MARKER
12201 77                                LD (HL), A
12202 2A,59,5C                          LD HL, (23641) E LINE
12205 2B                                DEC HL
12206 C9                                RET

STACK FETCH SUBROUTINE
12207 2A,65,5C GET PARAM(STK FETCH) LD HL, (23653) STK END
12210 2B                                DEC HL
12211 46                                LD B, (HL)
12212 2B                                DEC HL
12213 4E                                LD C, (HL)
12214 2B                                DEC HL
12215 56                                LD D, (HL)
12216 2B                                DEC HL
12217 5E                                LD E, (HL)
12218 2B                                DEC HL
12219 7E                                LD A, (HL)
12220 22,65,5C                          LD (23653), HL STK END
12223 C9                                RET

DIM COMMAND ROUTINE
12224 CD,70,2C                          DIM          CALL 11376 FIND N(LOOK VARS)
12227 C2,ED,18                          DIM REPT C    JP NZ, 7149 SYN ERR
12230 CD,89,28                          CALL 10377 INTERPRET?
12233 20,08                             JR NZ, 8 (12243) DIM RUN
12235 BC,B1                             RES 6, C ASSUME NUMERIC
12237 CD,54,2D                          CALL 11604 STK VAR
12240 CD,44,1B                          CALL 6980 END?
12243 38,08                             DIM RUN      JR C, 8 (12253) D-LETTER
12245 C5                                PUSH BC
12246 CD,20,17                          CALL 5920 RECORD LENGTH (NEXT 1)
12249 CD,50,17                          CALL 5968 DELETE RECORD
12252 C1                                POP BC
12253 CB,F9                             D-LETTER     SET 7, C ARRAY/FOR BIT ON
12255 06,00                             LD B, 0
12257 C5                                PUSH BC
12258 21,01,00                          LD HL, 1
12261 CB,71                             BIT 6, C STRING ARRAY?
12263 20,02                             JR NZ, 2 (12267) D SIZE
12265 2E,05                             LD L, 5
12267 EB                                D SIZE      EX DE, HL
12268 E7                                D # LOOP    RST 32 NEXT CHAR
12269 26,FF                             LD H, 255
12271 CD,8A,2E                          CALL 11914 INT EXP-1
12274 DA,DE,2D                          JP C, 11742 ERR 3
12277 E1                                POP HL
12278 C5                                PUSH BC
12279 24                                INC H
12280 E5                                PUSH HL
12281 60                                LD H, B

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12282 69		LD L, C
12283 CD, B2, 3E		CALL 11954 GET HL*DE
12286 EB		EX DE, HL
12287 DF		RST 24 GET CHAR
12288 FE, 2C		CP 44 ", "?
12290 28, E8		JR Z, 232 (12268) D # LOOP
12292 FE, 29		CP 41)?
12294 20, BB		JR NZ, 187 (12227) ERR C
12296 E7		RST 24 GET CHAR
12297 C1		POP BC
12298 79		LD A, C
12299 68		LD L, B
12300 26, 00		LD H, 0
12302 23		INC HL DETERMINE LENGTH
12303 23		INC HL
12304 29		ADD HL, HL
12305 19		ADD HL, DE
12306 DA, CF, 1F		JP C, 8143 ERR 4 (OUT OF RAM)
12309 D5		PUSH DE
12310 C5		PUSH BC
12311 E5		PUSH HL
12312 44		LD B, H
12313 4D		LD C, L
12314 2A, 59, 5C		LD HL, (23641) E LINE
12317 2B		DEC HL
12318 CD, BB, 12		CALL 4795 INSERT BC SPACES
12321 23		INC HL
12322 77		LD (HL), A
12323 C1		POP BC
12324 0B		DEC BC
12325 0B		DEC BC
12326 0B		DEC BC
12327 23		INC HL
12328 71		LD (HL), C ENTER LENGTH
12329 23		INC HL
12330 70		LD (HL), B
12331 C1		POP BC
12332 78		LD A, B
12333 23		INC HL
12334 77		LD (HL), A # OF DIMENSIONS
12335 62		LD H, D
12336 6B		LD L, E
12337 1B		DEC DE
12338 36, 00		LD (HL), 0
12340 CB, 71		BIT 6, C STRING?
12342 28, 02		JR Z, 2 (12346) DIM CLEAR SPACE
12344 36, 20		LD (HL), 32 SPACE
12346 C1	DIM CLEAR	POP BC
12347 ED, BB		LDDR
12349 C1	DIM SIZES	POP BC
12350 70		LD (HL), B ENTER SIZE
12351 2B		DEC HL
12352 71		LD (HL), C
12353 2B		DEC HL
12354 3D		DEC A COUNT

12355 20,F8
12357 C9

JR NZ, 248 (12349) DIM SIZES
RET

ALPHANUM SUBROUTINE

12358 CD,D9,30 ALNUM?
12361 3F
12362 D8

CALL 12505 DIGET?
CCF
RET C

ALPHA SUBROUTINE

12363 FE,41 ALPHA
12365 3F
12366 D0
12367 FE,5B
12369 D8
12370 FE,61
12372 3F
12373 D0
12374 FE,7B
12376 C9

CP 65 A?
CCF
RET NC
CP 91 [?
RET C
CP 97 a?
CCF
RET NC
CP 123 {?
RET

DECIMAL TO FLOATING POINT SUBROUTINE

12377 FE,C4 DEC TO FP (SKT UNS) CP 196 BIN?
12379 20,19 JR Z, 25 (12406) NOT BIN
12381 11,00,00 LD DE, 0
12384 E7 BIN DIGET RST 32 NEXT CHAR
12385 D6,31 SUB 49
12387 CE,00 ADC A, 0
12389 20,0A JR NZ, 10 (12401) BIN END
12391 EB EX DE, HL
12392 3F CCF
12393 ED,6A ADC HL, HL
12395 DA,6C,35 JP C, 13676 ERR 6
12398 EB EX DE, HL
12399 18,EF JR 239 (12384) BIN DIGET
12401 42 BIN END LD B, D
12402 4B LD C, E
12403 C3,E9,30 JP 12521 STK BC
12406 FE,2E DEC TO FP (NOT BIN) CP 46 ".?"
12408 28,0F JR Z, 15
12410 CD,F9,30 CALL 12537 INT TO FP
12413 FE,2E CP 46 ".?"
12415 20,28 JR NZ, 40 (12457) E FORMAT
12417 E7 RST 32 NEXT CHAR
12418 CD,D9,30 CALL 12505 DIGET?
12421 38,22 JR C, 34 (12457) E FORMAT
12423 18,0A JR 10 (12435) DEC-STORE 1
12425 E7 DECIMAL RST 32 NEXT CHAR
12426 CD,D9,30 CALL 12505 DIGET?
12429 DA,ED,1B ERR C? JP C, 7149 SYN ERR
12432 EF RST 40 FP CALC
12433 A0 STK 0
12434 38 END FP
12435 EF DEC STORE 1 RST 40 FP CALC
12436 A1 STK 1
12437 C0 STORE IN MEM 0

12438 02		DELETE
12439 38		END FP
12440 DF	NEXT DIGET-1	RST 24 GET CHAR
12441 CD,E0,30		CALL 12512 STK DIGET
12444 38,0B		JR C, 11 (12457) E FORMAT
12446 EF		RST 40 FP CALC
12447 E0		GET MEM 0
12448 A4		STK 10
12449 05		DIVIDE
12450 C0		STORE IN MEM 0
12451 04		MULTIPLY
12452 0F		ADD
12453 38		END FP
12454 E7		RST 32 NEXT CHAR
12455 18,EF		JR 239 (12440) NEXT DIGET-1
12457 FE,45	E FORMAT	CP 69 E?
12459 28,03		JR Z, 3 (12464) SIGN FLAG
12461 FE,65		CP 101 e?
12463 C0		RET NZ
12464 06,FF	SIGN FLAG	LD B, 255 (+)
12466 E7		RST 32 NEXT CHAR
12467 FE,2B		CP 45 "+"?
12469 28,05		JR Z, 5 SIGN DONE
12471 FE,2D		CP "-"?
12473 20,02		JR NZ, 2 (12477) STK E PART
12475 04		INC B =0 = "-"
12476 E7	SIGN DONE	RST 32 NEXT CHAR
12477 CD,D9,30	STK E PART	CALL 12505 DIGET?
12480 38,CB		JR C, 203 (12429) SYN ERR
12482 C5		PUSH BC
12483 CD,F9,30		CALL 12537 INT TO FP
12486 CD,93,31		CALL 12691 FP TO A
12489 C1		POP BC
12490 DA,6C,35		JP C 13676 ERR 6
12493 A7		AND A CLEAR FLAGS
12494 FA,6C,35		JP N, 13676 ERR 6
12497 04		INC B
12498 28,02		JR Z, 2 (12502) xEy JUMP
12500 ED,44		NEG
12502 C3,0D,31	xEy JUMP	JP 12557 xEy
NUMERIC SUBROUTINE		
12505 FE,30	DIGET?	CP 48 0?
12507 D8		RET C BELOW 0
12508 FE,3A		CP 58 9?
12510 3F		CCF RESET IF #
12511 C9		RET
STACK DIGET SUBROUTINE		
12512 CD,D9,30	STK DIGET	CALL 12505 DIGET?
12515 D8		RET C
12516 D6,30		SUB 48 CODE TO #
STACK A SUBROUTINE		
12518 4F	STK A	LD C, A USES BC WITH B=0


```

12519 06,00          LD B, 0

STACK BC SUBROUTINE
12521 FD,21,3A,5C    STK BC    LD IY, 23610  RESET IY
12525 AF              XOR A    CLEAR A & CARRY
12526 5F              LD E, A    =0          ONLY C & D
12527 51              LD D, C    LOW BYTE    ARE USED
12528 48              LD C, B    HIGH BYTE
12529 47              LD B, A    =0
12530 CD,74,2E        CALL 11892 PUT AEDCB
12533 EF              RST40 FP CALC  HL = SKT END -5
12534 38              END FP
12535 A7              AND A    CLEAR FLAGS
12536 C9              RET

```

INTEGER TO FLOATING POINT SUBROUTINE

```

12537 F5              INT TO FP    PUSH AF
12538 EF              RST 40 FP CALC
12539 A0              STK 0
12540 38              END FP
12541 F1              POP AF
12542 CD,E0,30 NEXT DIGET-2    CALL 12512 STK DIGET
12545 D8              RET C
12546 EF              RST 40 FP CALC
12547 01              EXCHANGE
12548 A4              STK 10
12549 04              MULTIPLY
12550 0F              ADD
12551 38              END FP
12552 CD,74,00        CALL 74 (RST 74) UPD-KEYBOARD
12555 18,F1           JR 241 (12542) NEXT DIGET-2

```

ARITHMETIC ROUTINES

E FORMAT TO FLOATING POINT SUBROUTINE

```

12557 07              xEy E FORMAT #  RLC A  TEST SIGN(BIT 7)
12558 0F              (OFFSET 60(3C)  RRC A  RESTORE A
12559 30,02           JR NC, 2 (12563) E SAVE
12561 2F              CPL    NEG M IN A WITHOUT CHANGING
12562 3C              INC A    CARRY FLAG
12563 F5              E SAVE    PUSH AF
12564 21,92,5C        LD HL, 23698 MEM BOTTOM
12567 CD,26,39        CALL 14630 FP 0 OR 1
12570 EF              RST 40 FP CALC
12571 A4              STK 10
12572 38              END FP
12573 F1              POP AF
12574 CB,3F           E LOOP    SRL A
12576 30,0D           JR NC, 13 (12591) E TEST END
12578 F5              PUSH AF
12579 EF              RST 40 FP CALC
12580 C1              STK TO MEM 1
12581 E0              GET MEM 0
12582 00,04           JUMP IF TRUE, 4 (12587) DIVIDE
12584 04              MULTIPLY
12585 33,02           JP 2 (12588) E FETCH

```

12587 05	E DIVISION	DIVIDE
12588 E1	E FETCH	GET MEM 1
12589 38		END FP
12590 F1		POP AF
12591 28,08		JR Z, 8 (12601) E END
12593 F5		PUSH AF
12594 EF		RST 40 FP CALC
12595 31		DUPLICATE
12596 04		MULTIPLY
12597 38		END FP
12598 F1		POP AF
12599 18,E5		JR 229 (12574) E LOOP
12601 EF	E END	RST 40 FP CALC
12602 02		DELETE
12603 38		END FP
12604 C9		RET

INTEGER FETCH SUBROUTINE

12605 23	LD DE (INT FETCH)	INC HL
12606 4E		LD C, (HL) SIGN
12607 23		INC HL
12608 7E		LD A, (HL) LOW BYTE
12609 A9		XOR C 2 COMP IF NEG
12610 91		SUB C
12611 5F		LD E, A SAVE IN E
12612 23		INC HL
12613 7E		LD A, (HL)
12614 89		ADC A, C 2 COMP IF NEG
12615 A9		XOR C
12616 57		LD D, A TO D
12617 C9		RET

INTEGER STORE SUBROUTINE

12618 0E,00	INT STORE(STK DE-U)	LD C, 0 POSITIVE # ENTRY POINT
12620 E5	STK DE-S	PUSH HL
12621 36,00		LD (HL), 0 1ST BYTE =0
12623 23		INC HL
12624 71		LD (HL), C SIGN
12625 23		INC HL
12626 7B		LD A, E LOW BYTE
12627 A9		XOR C 2 COMP IF NEG
12628 91		SUB C
12629 77		LD (HL), A PUT BYTE
12630 23		INC HL
12631 7A		LD A, D HIGH BYTE
12632 89		ADC A, C 2 COMP IF NEG
12633 A7		XOR C
12634 77		LD (HL), A HIGH BYTE
12635 23		INC HL
12636 36,00		LD (HL), 0 LAST BYTE
12638 E1		POP HL
12639 C9		RET

FLOATING POINT TO BC SUBROUTINE

12640 EF	FP TO BC	RST 40 FP CALC
----------	----------	----------------

```

12641 38
12642 7E
12643 A7
12644 28,05
12646 EF
12647 A2
12648 0F
12649 27
12650 38
12651 EF          FP DELETE
12652 02
12653 38
12654 E5
12655 D5
12656 EB
12657 46
12658 CD,3D,31
12661 AF
12662 90
12663 CB,79
12665 42
12666 4B
12667 7B
12668 D1
12669 E1
12670 C9

END FP  SET HL AT LAST #
LD A, (HL)
AND A CLEAR FLAGS
JR Z, 5 (12651) FP DELETE
RST 40 FP CALC
STK 1/2  ROUND THE NUMBER
ADD
INT
END FP
RST 40 FP CALC
DELETE
END FP
PUSH HL
PUSH DE
EX DE, HL
LD B, (HL)
CALL 12605 LD DE (GET INT)
XOR A  CLEAR A & CARRY
SUB B
BIT 7, C  SET Z IF +
LD B, D
LD C, E
LD A, E
POP DE
POP HL
RET

```

LOG (2^A) SUBROUTINE

```

12671 57  GET EXP (LOG(2^A))
12672 17
12673 9F
12674 5F
12675 4F
12676 AF
12677 47
12678 CD,74,2E
12681 EF
12682 34
12683 EF,1A,20,9A,85
12688 04
12689 27
12690 38

LD D, A
RL A      TEST BIT 7
SBC A, A  IF + AS 00,00,A,00,00
LD E, A   IF - AS 00,FF,A,FF,00
LD C, A
XOR A
LD B, A
CALL 11892 PUT AEDBC
RST 40 FP CALC
STK DATA
EXP 7F,+1A,+20,+9A,+85
MULTIPLY
INT
END FP

```

FLOATING POINT TO A SUBROUTINE

```

12691 CD,60,31  FP TO A
12694 D8
12695 F5
12696 05
12697 04
12698 28,03
12700 F1
12701 37
12702 C9
12703 F1          FPA END
12704 C9

CALL 12640  FP TO BC
RET C
PUSH AF
DEC B      B MUST BE 0
INC B
JR Z, 3 (12703) FPA END
POP AF
SCF
RET
POP AF
RET

```

PRINT A FLOATING POINT NUMBER SUBROUTINE

12705 EF	PRINT FP (OUTPUT)	RST 40 FP CALC
12706 31		DUPLICATE
12707 36		TEST <0
12708 00,0B		JUMP IF TRUE, 11 (12720) PF-NEG
12710 31		DUPLICATE
12711 37		TEST >0
12712 00,0D		JUMP IF TRUE, 14 (12726) PF-POS
12714 02		DELETE
12715 38		END FP
12716 3E,30		LD A, 48 "0"
12718 D7		RST 16 PRINT CHAR
12719 C9		RET
12720 2A	PF-NEG	ABS
12721 38		END FP
12722 3E,2D		LD A, 45 "--"
12724 D7		RST 16 PRINT CHAR
12725 EF		RST 40 FP CALC
12726 A0	PF-POS	STK 0
12727 C3		STK TO MEM 3
12728 C4		STK TO MEM 4
12729 C5		STK TO MEM 5
12730 02		DELETE
12731 38		END FP
12732 D9		EXX
12733 E5		PUSH HL
12734 D9		EXX
12735 EF	PF LOOP	RST 40 FP CALC
12736 31		DUPLICATE
12737 27		INT-
12738 C2		STK TO MEM 2
12739 03		SUBTRACT
12740 E2		GET MEM 2
12741 01		EXCHANGE
12742 C2		STK TO MEM 2
12743 02		DELETE
12744 38		END FP
12745 7E		LD A, (HL)
12746 A7		AND A CLEAR FLAGS
12747 20,48		JR NZ, 72 (12821) PF LARGE
12749 CD,3D,31		CALL 12605 LD DE
12752 06,10		LD B, 16 COUNT
12754 7A		LD A, D
12755 A7		AND A CLEAR FLAGS
12756 20,06		JR NZ, 6 (12754) PF SAVE
12758 B3		OR E DE = 0?
12759 28,09		JR Z, 9 (12770) PF SMALL
12761 53		LD D, E
12762 06,08		LD B, 8 REDUCE COUNT TO 8
12764 D5	PF SAVE	PUSH DE
12765 D9		EXX
12766 D1		POP DE
12767 D9		EXX
12768 18,58		JR 88 (12858) PF BITS

12770 EF	PF SMALL	RST 40 FP CALC
12771 02		DELETE
12772 E2		GET MEM 2
12773 38		END FP
12774 7E		LD A, (HL)
12775 D6, 7E		SUB 126 TRUE EXPONENT +2
12777 CD, 7F, 31		CALL 12671 GET EXPONENT
12780 57		LD D, A
12781 3A, AC, 5C		LD A, (23724) MEM 5, 2ND POSN
12784 92		SUB D
12785 32, AC, 5C		LD (23724), A
12788 7A		LD A, D
12789 CD, 0D, 31		CALL 12557 xEy
12792 EF		RST 40 FP CALC
12793 31		DUPLICATE
12794 27		INT
12795 C1		STK TO MEM 1
12796 03		SUBTRACT
12797 E1		GET MEM 1
12798 38		END FP
12799 CD, 93, 31		CALL 12691 FP TO A
12802 E5		PUSH HL
12803 32, A1, 5C		LD (23713), A MEM 3, POSN 1
12806 3D		DEC A
12807 17		RL A TEST BIT 7
12808 9F		SBC A, A
12809 3C		INC A
12810 21, AB, 5C		LD HL, 23723 MEM 5, POSN 1
12813 77		LD (HL), A
12814 23		INC HL
12815 86		ADD A, (HL)
12816 77		LD (HL), A
12817 E1		POP HL
12818 C3, 8E, 32		JP 12942 PF FRACTION
12821 D6, 80	PF LARGE	SUB 128 TRUE EXP
12823 FE, 1C		CP 28 EXP<28
12825 38, 13		JR C, 19 (12846) PF MEDIUM
12827 CD, 7F, 31		CALL 12671 GET EXPONENT
12830 D6, 07		SUB 7
12832 47		LD B, A
12833 21, AC, 5C		LD HL, 23724 MEM 5, POSN 2
12836 86		ADD A, (HL)
12837 77		LD (HL), A
12838 78		LD A, B
12839 ED, 44		NEG
12841 CD, 0D, 31		CALL 12557 xEy
12844 18, 91		JR 145 (12735) PF LOOP
12846 EB	PF MEDIUM	EX DE, HL
12847 CD, 79, 33		CALL 13177 GET 2 #S
12850 D9		EXX
12851 CB, FA		SET 7, D
12853 7D		LD A, L
12854 D9		EXX
12855 D6, 80		SUB 128 TRUE EXPONENT
12857 47		LD B, A

12858 CB,23	PF BITS	SLA E
12860 CB,12		RL D
12862 D9		EXX
12863 CB,12		RL E
12865 CB,13		RL D
12867 D9		EXX
12868 21,AA,5C		LD HL, 23722 MEM 4, POSN 5
12871 0E,05		LD C, 5 COUNT 5
12873 7E	PF BYTES	LD A, (HL)
12874 8F		ADC A, A
12875 27		DAA
12876 77		LD (HL), A
12877 2B		DEC HL
12878 0D		DEC C
12879 20,F8		JR NZ, 248 (12873) PF BYTES
12881 10,E7		DJNZ, 231 (12858) PF BITS
12883 AF		XOR A CLEAR A & CARRY
12884 21,A6,5C		LD HL, 23718 MEM 4
12887 11,A1,5C		LD DE, 23713 MEM 3
12890 06,09		LD B, 9 MAX DIGITS
12892 ED,6F		RL D
12894 0E,FF		LD C, 255 LEADING 0
12896 ED,6F	PF DIGITS	RL D
12898 20,04		JR NZ, 4 (12904) PF INSERT
12900 0D		DEC C
12901 0C		INC C
12902 20,0A		JR NZ, 10 (12914) PF TEST-2
12904 12	PF INSERT	LD (DE), A
12905 13		INC DE
12906 FD,34,71		INC (IY+113) MEM 5, 1ST POSN
12909 FD,34,72		INC (IY+114) MEM 5, 2ND POSN
12912 0E,00		LD C, 0 OTHER 0
12914 CB,40	PF TEST-2	BIT 0, B B ODD?
12916 28,01		JR Z, 1 (12919) PF ALL 0
12918 23		INC HL
12919 10,E7	PF ALL 0	DJNZ, 231 (12896) PF DIGITS
12921 3A,AB,5C		LD A, (23725) MEM 5, POSN 1
12924 D6,09		SUB 9 CK # OF DIGITS
12926 38,0A		JR C, 10 (12938) PF MODE
12928 FD,35,71		DEC (IY+113) MEM 5, POSN 1
12931 3E,04		LD A, 4
12933 FD,BE,6F		CP (IY+111) MEM 4, POSN 4 ROUND UP?
12936 18,41		JR 65 (13003) PF ROUND
12938 EF	PF MODE	RST 40 FP CALC
12939 02		DELETE
12940 E2		GET MEM 2
12941 38		END FP
12942 EB	PF FRACTION	EX DE, HL
12943 CD,79,33		CALL 13177 GET 2 #S
12946 D9		EXX
12947 3E,80		LD A, 128 EXPONENT = 0
12949 95		SUB L
12950 2E,00		LD L, 0
12952 CB,FA		SET 7, D
12954 D9		EXX

12955 CD,9C,33	CALL 13212 SHIFT FP
12958 FD,7E,71 PF FRACT LOOP	LD A, (IY+113) MEM 5, POSN 1
12961 FE,08	CP 8
12963 38,06	JR C, 6 (12971) PF FRACT DIGIT
12965 D9	EXX
12966 CB,12	RL D
12968 D9	EXX
12969 18,20	JR 32 (13003) PF ROUND
12971 01,00,02 PF FRACT DIGIT	LD BC, B=2 COUNT
12974 7B PF FRACT EXPON	LD A, E
12975 CD,4A,33	CALL 13130 CA=10*A+C
12978 5F	LD E, A
12979 7A	LD A, D
12980 CD,4F,33	CALL 13130 CA=10*A+C
12983 57	LD D, A
12984 C5	PUSH BC
12985 D9	EXX
12986 C1	POP BC
12987 10,F1	DJNZ, 241 (12974) PF FRACT EXPON
12989 21,A1,5C	LD HL, 23713 MEM 3, POSN 1
12992 79	LD A, C
12993 FD,4E,71	LD C, (IY+113) MEM 5, POSN 1
12996 09	ADD HL, BC
12997 77	LD (HL), A
12998 FD,34,71	INC (IY+113) MEM 5, POSN 1
13001 18,D3	JR 211 (12958) PF FRACT LOOP
13003 F5 PF ROUND	PUSH AF
13004 21,A1,5C	LD HL, 23713 MEM 3, POSN 1
13007 FD,4E,71	LD C, (IY+113) MEM 5, POSN 1
13010 06,00	LD B, 0
13012 09	ADD HL, BC
13013 41	LD B, C
13014 F1	POP AF
13015 2B PF ROUND LOOP	DEC HL
13016 7E	LD A, (HL)
13017 CE,00	ADC A, 0
13019 77	LD (HL), A
13020 A7	AND A CLEAR FLAGS
13021 28,05	JR Z, 5 (13028) PF ROUND BACK
13023 FE,0A	CP 10 LAST DIGIT 0 ?
13025 3F	CCF
13026 30,08	JR NC, 8 (13036) PF COUNT
13028 10,F1 PF ROUND BACK	DJNZ, 241 (13015) PF ROUND LOOP
13030 36,01	LD (HL), 1
13032 04	INC B
13033 FD,34,72	INC (IY+114) MEM 5, POSN 2
13036 FD,70,71	INC (IY+113) MEM 5, POSN 1
13039 EF	RST 40 FP CALC
13040 02	DELETE
13041 38	END FP
13042 D9	EXX
13043 E1	POP HL
13044 D9	EXX
13045 ED,4B,AB,5C	LD BC, (23723) MEM 5, POSN 1
13049 21,A1,5C	LD HL, 23713 START OF NUMBERS

13052 78		LD A, B
13053 FE,09		CP 9 MORE THAN 9 DIGITS?
13055 38,04		JR C, 4 (13061) PF NOT E
13057 FE,FC		CP 252 MORE THAN 4 LEADING 0
13059 38,26		JR C, 38 (13099) PF E FORMAT
13061 A7	PF NOT E	AND A CLEAR FLAGS
13062 CC,EA,11		CALL Z, 4586 PUT DIGIT
13065 AF	PF E SUBROUTINE	XOR A CLEAR A & CARRY
13066 90		SUB B
13067 FA,11,33		JP N, 13073 PF OUT LOOP
13070 47		LD B, A
13071 18,0C		JR 12 (13085) PF DECIMAL
13073 79	PF OUT LOOP	LD A, C
13074 A7		AND A CLEAR FLAGS
13075 28,03		JR Z, 3 (13080) PF OUT DIGIT
13077 7E		LD A, (HL)
13078 23		INC HL
13079 9D		DEC C
13080 CD,EA,11	PF OUT DIGIT	CALL 4586 PUT DIGIT
13083 10,F4		DJNZ, 244 (13073) PF OUT LOOP
13085 79	PF DECIMAL	LD A, C
13086 A7		AND A CLEAR FLAGS
13087 C8		RET Z
13088 04		INC B
13089 3E,2E		LD A, 46 "."
13091 D7	PF DEC 0'S	RST 16 PRINT CHAR
13092 3E,30		LD A, 48 "0"
13094 10,FB		DJNZ, 251 (13091) PF DEC 0'S
13096 41		LD B, C
13097 18,E6		JR 230 (13073) PF OUT LOOP
13099 50	PF E FORMAT	LD D, B
13100 15		DEC D
13101 06,01		LD B, 1 DIGIT BEFORE DEC POINT
13103 CD,09,33		CALL 13065 PF E SUBROUTINE
13106 3E,45		LD A, 69 "E"
13108 D7		RST 16 PRINT CHAR
13109 4A		LD C, D
13110 79		LD A, C
13111 A7		AND A CLEAR FLAGS
13112 F2,42,33		JP P, 13122 PF E-POS
13115 ED,44	PF E-NEG	NEG
13117 4F		LD C, A
13118 3E,2D		LD A, 45 "--"
13120 18,02		JR 2 (13124) PF EXP SIGN
13122 3E,2B	PF E-POS	LD A, 43 "+"
13124 D7	PF EXP SIGN	RST 16 PRINT CHAR
13125 06,00		LD B, 0
13127 C3,88,17		JP 6024 PUT BC
CA = 10*A+C SUBROUTINE		
13130 D5	CA = 10*A+C	PUSH DE
13131 6F		LD L, A
13132 26,00		LD H, 0
13134 5D		LD E, L
13135 54		LD D, H

13136 29		ADD HL, HL	X 10
13137 29		ADD HL, HL	
13138 19		ADD HL, DE	
13139 29		ADD HL, HL	
13140 59		LD E, C	ADD C
13141 19		ADD HL, DE	
13142 4C		LD C, H	OVERFLOW TO H
13143 7D		LD A, L	# TO A
13144 D1		POP DE	
13145 C9		RET	

PREPARE TO ADD SUBROUTINE

13146 7E	PREF ADD	LD A, (HL)	EXPONENT
13147 36,00		LD (HL), 0	ASSUME +
13149 A7		AND A	CLEAR FLAGS
13150 C8		RET Z	
13151 23		INC HL	
13152 CB,7E		BIT 7, (HL)	
13154 CB,FE		SET 7, (HL)	
13156 2B		DEC HL	
13157 C8		RET Z	
13158 C5		PUSH BC	SAVE EXPONENT
13159 01,05,00		LD BC, 5	NEED 5 SPACES
13162 09		ADD HL, BC	
13163 41		LD B, C	
13164 4F		LD C, A	
13165 37		SCF	
13166 2B	NEG BYTE	DEC HL	=255 = NEGATIVE
13167 7E		LD A, (HL)	
13168 2F		CPL	ONES COMP
13169 CE,00		ADC A, 0	
13171 77		LD (HL), A	
13172 10,F8		DJNZ, 248 (13166)	NEG BYTE
13174 79		LD A, C	
13175 C1		POP BC	
13176 C9		RET	

FETCH TWO NUMBERS SUBROUTINE

HL AT 1ST BYTE #1, DE AT 1ST BYTE #2
 RETURNS WITH 1ST IN H',B',C',C,B; 2ND IN L',D',E',D,E

13177 E5	GET 2 #	PUSH HL
13178 F5		PUSH AF
13179 4E		LD C, (HL)
13180 23		INC HL
13181 46		LD B, (HL)
13182 77		LD (HL), A
13183 23		INC HL
13184 79		LD A, C
13185 4E		LD C, (HL)
13186 C5		PUSH BC
13187 23		INC HL
13188 4E		LD C, (HL)
13189 23		INC HL
13190 46		LD B, (HL)
13191 EB		EX DE, HL

13192	57	LD D, A
13193	5E	LD E, (HL)
13194	D5	PUSH DE
13195	23	INC HL
13196	56	LD D, (HL)
13197	23	INC HL
13198	5E	LD E, (HL)
13199	D5	PUSH DE
13200	D9	EXX
13201	D1	POP DE
13202	F1	POP HL
13203	C1	POP BC
13204	D9	EXX
13205	23	INC HL
13206	56	LD D, (HL)
13207	23	INC HL
13208	5E	LD E, (HL)
13209	F1	POP AF
13210	E1	POP HL
13211	C9	RET

SHIFT ADDEND SUBROUTINE (TO 32 DECIMAL)

FOR ADDING/SUBTRACTING # THAT DIFFER BY MORE THAN 20(HEX) POSNS

13212	A7	SHIFT ADDEND (SHIFT FF) AND A	CLEAR FLAGS
13213	C8	RET Z	(NO DIFF IN EXP)
13214	FE,21	CP 33	
13216	30,16	JR NC, 22 (13240)	ADD END 0
13218	C5	PUSH BC	
13219	47	LD B, A	
13220	D9	EXX	
13221	CB,2D	SRA L	
13223	CB,1A	RR D	
13225	CB,1B	RR E	
13227	D9	EXX	
13228	CB,1A	RR D	
13230	CB,1B	RR E	
13232	10,F2	DJNZ, 242 (13220)	ONE SHIFT
13234	C1	POP BC	
13235	D0	RET NC	
13236	CD,C3,33	CALL 13251	ADD BACK
13239	C0	RET NZ	
13240	D9	EXX	
13241	AF	XOR A	CLEAR A & CARRY
13242	2E,00	LD L, 0	
13244	57	LD D, A	
13245	5D	LD E, L	
13246	D9	EXX	
13247	11,00,00	LD DE, 0	
13250	C9	RET	

ADD BACK SUBROUTINE

13251	1C	ADD BACK	INC E
13252	C0		RET NZ
13253	14		INC D
13254	C0		RET NZ

13255 D9		EXX
13256 1C		INC E
13257 20,01		JR NZ, 1 (13260) ALL ADD
13259 14		INC D
13260 D9	ALL ADD	EXX
13261 C9		RET

SUBTRACTION OPERATION

13262 EB	SUBTRACT(OFFSET 3)	EX DE, HL
13263 CD,2D,38		CALL 14381 NEGATE

ADDITION OPERATION

13266 EB	ADD(OFFSET 15(OFF))	EX DE,HL
13267 1A		LD A, (DE)
13268 B6		OR (HL)
13269 20,26		JR NZ, 38 (13309) FULL ADDITION
13271 D5		PUSH DE
13272 23		INC HL
13273 E5		PUSH HL
13274 23		INC HL
13275 5E		LD E, (HL)
13276 23		INC HL
13277 56		LD D, (HL)
13278 23		INC HL
13279 23		INC HL
13280 23		INC HL
13281 7E		LD A, (HL)
13282 23		INC HL
13283 4E		LD C, (HL)
13284 23		INC HL
13285 46		LD B, (HL)
13286 E1		POP HL
13287 EB		EX DE, HL
13288 09		ADD HL, BC
13289 EB		EX DE, HL
13290 8E		ADC A, (HL)
13291 0F		RRC A
13292 CE,00		ADC A, 0
13294 20,0B		JR NZ, 11 (13307) ADD OVERFLOW
13296 9F		SBC A, A
13297 77		LD (HL), A
13298 23		INC HL
13299 73		LD (HL), E
13300 23		INC HL
13301 72		LD (HL), D
13302 2B		DEC HL
13303 2B		DEC HL
13304 2B		DEC HL
13305 D1		POP DE
13306 C9		RET
13307 2B	ADD OVERFLOW	DEC HL
13308 D1		POP DE
13309 CD,52,36	FULL ADDITION	CALL 13906 RESTACK TWO
13312 D9		EXX
13313 E5		PUSH HL

13314 D9		EXX
13315 D5		PUSH DE
13316 E5		PUSH HL
13317 CD, 5A, 33		CALL 13146 PREP ADD
13320 47		LD B, A
13321 EB		EX DE, HL
13322 CD, 5A, 33		CALL 13146 PREP ADD
13325 4F		LD C, A
13316 B8		CP B
13327 30, 03		JR NC, 3 (13332) SHIFT LEN
13329 78		LD A, B
13330 41		LD B, C
13331 EB		EX DE, HL
13332 F5	SHIFT LEN	PUSH AF
13333 90		SUB B
13334 CD, 79, 33		CALL 13177 GET 2 #
13337 CD, 9C, 33		CALL 13212 SHIFT FP
13340 F1		POP AF
13341 E1		POP HL
13342 77		LD (HL), A
13343 E5		PUSH HL
13344 68		LD L, B
13345 61		LD H, C
13346 19		ADD HL, DE
13347 D9		EXX
13348 EB		EX DE, HL
13349 ED, 4A		ADC HL, BC
13351 EB		EX DE, HL
13352 7C		LD A, H
13353 8D		ADC A, L
13354 6F		LD L, A
13355 1F		RR A
13356 AD		XOR L
13357 D9		EXX
13358 EB		EX DE, HL
13359 E1		POP HL
13360 1F		RR A
13361 30, 08		JR NC, 8 (13371) TEST NEG
13363 3E, 01		LD A, 1
13365 CD, 9C, 33		CALL 13212 SHIFT FP
13368 34		INC (HL)
13369 28, 23		JR Z, 35 (13406) ADD REP-6
13371 D9	TEST NEG	EXX
13372 7D		LD A, L
13373 E6, 80		AND 128 CK BIT 7 NEGATIVE?
13375 D9		EXX
13376 23		INC HL
13377 77		LD (HL), A
13378 2B		DEC HL
13379 28, 1F		JR Z, 31 (13412) GO NC-MLT
13381 7B		LD A, E
13382 ED, 44		NEG
13384 3F		CCF
13385 5F		LD E, A
13386 7A		LD A, D

13387 2F		CF L ONES COMP
13388 CE,00		ADC A, 0
13390 5F		LD E, A
13391 D9		EXX
13392 7B		LD A, E
13393 2F		CPL ONES COMPLIMENT
13394 CE,00		ADC A, 0
13396 5F		LD E, A
13397 7A		LD A, D
13398 3F		CPL ONES COMPLIMENT
13399 CE,00		ADC A, 0
13401 30,07		JR NC, 7 (13412) END COMPLIMENT
13403 1F		RR A
13404 D9		EXX
13405 34		INC (HL)
13406 CA,6C,35	ADD REP-6	JP Z, 13676 ERR 6
13409 D9		EXX
13410 57	END COMP	LD D, A
13411 D9		EXX
13412 AF	GO NC MLT	XOR A CLEAR A & CARRY
13413 C3,14,35		JP 13588 TEST NORM

MULTIPLY (HL*DE) SUBROUTINE

13416 C5	MULTIPLY (HL*DE)	PUSH BC
13417 06,10		LD B, 16 COUNT
13419 7C		LD A, H
13420 4D		LD C, L
13421 21,00,00		LD HL, 0
13424 29	MULT LOOP	ADD HL, HL
13425 38,0A		JR C, 10 (13437) M END
13427 CB,11		RL C
13429 17		RL A
13430 30,03		JR NC, 3 (13435) AGAIN
13432 19		ADD HL, DE
13433 38,02		JR C, 2 (13437) M END
13435 10,F3	AGAIN	DJNZ, 243 (13424) MULT LOOP
13437 C1	M END	POP BC
13438 C9		RET

PREPARE TO MULTIPLY OR DIVIDE SUBROUTINE

13439 CD,04,39	PREP M/D	CALL 14596 TEST 0
13442 D8		RET C
13443 23		INC HL
13444 AE		XOR (HL)
13445 CB,FE		SET 7, (HL) TRUE BIT
13447 2B		DEC HL
13448 C9		RET

MULTIPLICATION OPERATION

13449 1A	TIMES (OFFSET 4)	LD A, (DE)
13450 B6		OR (HL)
13451 20,22		JR NZ, 34 (13487) MULT-LONG
13453 D5		PUSH DE SAVE 2ND POINTER
13454 E5		PUSH HL SAVE 1ST POINTER
13455 D5		PUSH DE SAVE 2ND POINTER

13456 CD,3D,31	CALL 12605 LD DE (GET INT)
13459 EB	EX DE, HL
13460 E3	EX (SP), HL
13461 41	LD B, C
13462 CD,3D,31	CALL 12605 LD DE (GET INT)
13465 78	LD A, B
13466 A9	XOR C
13467 4F	LD C, A
13468 E1	POP HL
13469 CD,68,34	CALL 13416 MULT HL*DE
13472 EB	EX DE, HL
13473 E1	POP HL
13474 38,0A	JR C, 10 (13486) MULT OVERFLOW
13476 7A	POP DE
13477 B3	OR E
13478 20,01	JR NZ, 1 (13481) MULT RESULT
13480 4F	LD C, A
13481 CD,4C,31 MULT RESULT	CALL 12620 STK DE U
13484 D1	POP DE
13485 C9	RET
13486 D1 MULT OVERFLOW	POP DE
13487 CD,52,36 MULT LONG	CALL 13906 RESTACK TWO
13490 AF	XOR A CLEAR A & CARRY
13491 CD,7F,34	CALL 13439 PREP M/D
13494 D8	RET C
13495 D9	EXX
13496 E5	PUSH HL
13497 D9	EXX
13498 D5	PUSH DE
13499 EB	EXX
13500 CD,79,33	CALL 13439 PREP M/D
13503 EB	EX DE, HL
13504 38,5A	JR C, 90 (13596) RESULT = 0
13506 E5	PUSH HL
13507 CD,79,33	CALL 13177 GET 2 #
13510 78	LD A, B
13511 A7	AND A CLEAR FLAGS
13512 ED,62	SBC HL, HL HL = 0
13514 D9	EXX
13515 E5	PUSH HL
13516 ED,62	SBC HL, HL HL = 0
13518 D9	EXX
13519 06,21	LD B, 33 COUNT 33 SHIFTS
13521 18,11	JR 17 (13540) STRAIGHT MULT
13523 30,05	JR NC, 5 (13530) NO ADD
13525 19 MULT LOOP	ADD HL, DE
13526 D9	EXX
13527 ED,5A	ADC HL, DE
13529 D9	EXX
13530 D9 NO ADD	EXX
13531 CB,1C	RR H
13533 CB,1D	RR L
13535 D9	EXX
13536 CB,1C	RR H
13538 CB,1D	RR L

13540 D9	STRAIGHT MULT	EXX
13541 CB, 18		RR B
13543 CB, 19		RR C
13545 D9		EXX
13546 CB, 19		RR C
13548 1F		RR A
13549 10, E4		DJNZ, 228 (13525) MULT LOOP
13551 EB		EX DE, HL
13552 D9		EXX
13553 EB		EX DE, HL
13554 D9		EXX
13555 C1		POP BC ADD EXPONENT
13556 E1		POP HL
13557 78		LD A, B
13558 81		ADD A, C
13559 20, 01		JR NZ, 1 (13562) CALC EXPONENT
13561 A7		AND A CLEAR FLAGS
13562 3D	CALC EXPONENT	DEC A
13563 3F		CCF
13564 17	DIVISIVN EXPONENT	RL A
13565 3F		CCF
13566 1F		RR A
13567 F2, 05, 35		JR P 13573 OVERFLOW CLEAR
13570 30, 68		JR NC, 104 (13676) ERR 6
13572 A7		AND A CLEAR FLAGS
13573 3C	OVERFLOW CLEAR	INC A
13574 20, 08		JR NZ, 8 (13584) OVERFLOW CLEAR-2
13576 38, 06		JR C, 6 (13584) OVERFLOW CLEAR-2
13578 D9		EXX
13579 CB, 7A		BIT 7, D NORMAL FORM?
13581 D9		EXX
13582 20, 5C		JR NZ, 92 (13676) ERR 6
13584 77	OVERFLOW CLEAR-2	LD (HL), A
13585 D9		EXX
13586 78		LD A, B
13587 D9		EXX
13588 30, 15	TEST NORM	JR NC, 21 (13610) NORMALIZE
13590 7E		LD A, (HL)
13591 A7		AND A CLEAR FLAGS
13592 3E, 80	NEAR 0	LD A, 128 EXP = 0
13594 28, 01		JR Z, 1 (13597) SKIP 0
13596 AF	RESULT = 0	XOR A CLEAR A
13597 D9	SKIP 0	EXX
13598 A2		AND D
13599 CD, BA, 33		CALL 13242 ZEROS 4/5
13602 07		RLC A
13603 77		LD (HL), A
13604 38, 2E		JR C, 46 (13652) OVERFLOW CLEAR
13606 23		INC HL
13607 77		LD (HL), A
13608 2B		DEC HL
13609 18, 29		JR 41 (13652) OVERFLOW CLEAR
13611 06, 20	NORMALIZE	LD B, 32 COUNT 32
13613 D9	SHIFT 1	EXX OR
13614 CB, 7A		BIT 7, D UNTIL BIT 7 SET

13616 D9		EXX
13617 20,12		JR NZ, 18 (13637) NORMAL NOW
13619 07		RLC A
13620 CB,13		RL E
13622 CB,12		RL D
13624 D9		EXX
13625 CB,13		RL E
13627 CB,12		RL D
13629 D9		EXX
13630 35		DEC (HL)
13631 28,D7		JR Z, 215 (13592) NEAR 0
13633 10,EA		DJNZ, 234 (13613) SHIFT 1
13635 18,D7		JR 215 (13596) RESULT = 0
13637 17	NORMAL NOW	RL A
13638 30,OC		JR NC, 12 (13652) OVERFLOW CLEAR
13640 CD,C3,33		CALL 13251 ADD BACK
13643 20,07		JR NZ, 7 (13652) OVERFLOW CLEAR
13645 D9		EXX
13646 16,80		LD D, 128
13648 D9		EXX
13649 34		INC (HL)
13650 28,18		JR Z, 24 (13676) ERR C
13652 E5	OVERFLOW CLEAR	PUSH HL
13653 23		INC HL
13654 D9		EXX
13655 D5		PUSH DE
13656 D9		EXX
13657 C1		POP BC
13658 78		LD A, B
13659 17		RL A
13660 CB,16		RL (HL)
13662 1F		RR A
13663 77		LD (HL), A STORE #
13664 23		INC HL
13665 71		LD (HL), C
13666 23		INC HL
13667 72		LD (HL), D
13668 23		INC HL
13669 73		LD (HL), E
13670 E1		POP HL
13671 D1		POP DE
13672 D9		EXX
13673 E1		POP HL
13674 D9		EXX
13675 C9		RET
13676 CF	ERR 6	RST 8 ERROR
13677 05		6 Number too big

DIVISION OPERATION

13678 CD,52,36	DIVIDE(OFFSET 5)	CALL 13906 RESTAK TWO
13681 EB		EX DE, HL
13682 AF		XOR A CLEAR A FOR SIGN 1ST #
13683 CD,7F,35		CALL 13439 PREP M/D
13686 38,F4		JR C, 244 (13676) ERR 6
13688 EB		EX DE, HL

13689	CD,7F,34		CALL 13439 PREP M/D
13692	D8		RET C
13693	D9		EXX
13694	E5		PUSH HL
13695	D9		EXX
13696	D5		PUSH DE
13697	E5		PUSH HL
13698	CD,79,33		CALL 13177 GET 2 #
13701	D9		EXX
13702	E5		PUSH HL
13703	60		LD H, B
13704	69		LD L, C
13705	D9		EXX
13706	61		LD H, C
13707	68		LD L, B
13708	AF		XOR A CLEAR A & CARRY
13709	06,DF		LD B, 223 COUNT -33
13711	18,10		JR 16 (13726) DIVIDE START
13713	17	DIV LOOP	RL A
13714	CB,11		RL C
13716	D9		EXX
13717	CB,11		RL C
13719	CB,10		RL B
13721	D9		EXX
13722	29	DIV 34TH	ADD HL, HL
13723	D9		EXX
13724	ED,6A		ADC HL, HL
13726	D9	DIVIDE START	EXX
13727	38,10		JR C, 16 (13745) SUB # ONLY
13729	ED,52		SBC HL, DE
13731	D9		EXX
13732	ED,52		SBC HL, DE
13734	D9		EXX
13735	30,0F		JR NC, 15 (13752) # RESTORE
13737	19		ADD HL, DE
13738	D9		EXX
13739	ED,5A		ADC HL, DE
13741	D9		EXX
13742	A7		AND A CLEAR A & CARRY
13743	18,08		JR 8 (13753) COUNT 1
13745	A7	SUB # ONLY	AND A CLEAR A
13746	ED,52		SBC HL, DE
13748	D9		EXX
13749	ED,52		SBC HL, DE
13751	D9		EXX
13752	37	# RESTORE	SCF
13753	04	COUNT 1	INC B
13754	FA,91,35		JP N, 13713 DIVIDE LOOP
13757	F5		PUSH AF
13758	28,DA		JR Z, 218(214) (13722) DIV 34TH
13760	5F		LD E, A
13761	51		LD D, C
13762	D9		EXX
13763	59		LD E, C

13764 50	LD D, B
13765 F1	POP AF
13766 CB, 18	RR B
13768 F1	POP AF
13769 CB, 18	RR B
13771 D9	EXX
13772 C1	POP BC
13773 E1	POP HL
13774 78	LD A, B
13775 91	SUB C
13776 CD, FC, 34	JP 13564 DIVIDE EXPONENT

INTERGER TRUNCATE TO ZERO SUBROUTINE

13779 7E TRUNCATE (OFFSET 58(3A))	LD A, (HL)	
13780 7A	AND A CLEAR FLAGS	
13781 CB	RET Z	
13782 FE, 81	CP 129 EXPONENT = 1?	
13784 30, 06	JR NC, 6 (13792) T->0	
13786 36, 00	LD (HL), 0 SET EXP = 0	
13788 3E, 20	LD A, 32 COUNT	
13790 18, 51	JR 81 (13873) NIL BYTES	
13792 FE, 91	CP 145 NEED E FORMAT?	T->0
13794 20, 1A	JR NZ, 26 (13822) T-SMALL	
13796 23	INC HL !!ERROR!! 13796-13821	
SHOULD BE ELIMINATED AS THEY CHECK -65536 WHICH IS UNNECESSARY		
13797 23	INC HL	
13798 23	INC HL	
13799 3E, 80	LD A, 128 EXP 0	
13801 A6	AND (HL)	
13802 2B	DEC HL	
13803 B6	OR (HL)	
13804 2B	DEC HL	
13805 20, 03	JR NZ, 3 (13810) T-FIRST	
13807 3E, 80	LD A, 128	
13809 AE	XOR (HL)	
13810 2B	DEC HL	T-FIRST
13811 20, 36	JR NZ, 54 (13867) T EXPONENT	
13813 77	LD (HL), A	
13814 23	INC HL	
13815 36, FF	LD (HL), 255	
13817 2B	DEC HL	
13818 3E, 18	LD A, 24	
13820 18, 33	JR 51, (13873) NIL BYTES	
13822 30, 2C	JR NC, 44 (13868) X LARGE	T-SMALL
13824 D5	PUSH DE	
13825 2F	CP L CHANGE RANGE TO 15-0	
13826 C6, 91	ADD A, 125	
13828 23	INC HL	
13829 56	LD D, (HL)	
13830 23	INC HL	
13831 5E	LD E, (HL)	
13832 2B	DEC HL	
13833 2B	DEC HL	
13834 0E, 00	LD C, 0	
13836 CB, 7A	BIT 7, D NEGATIVE?	

13838 28,01		JR Z, 1 (13841) T-NUMERIC
13840 OD		DEC C
13841 CB,FA	T-NUMERIC	SET 7, D INSERT TRUE BIT
13843 06,08		LD B, 8
13845 90		SUB B
13846 80		ADD A, B
13847 38,04		JR C, 4 (13853) T TEST
13849 5A		LD E, D
13850 16,00		LD D, 0
13852 90		SUB B
13853 28,07	T TEST	JR Z, 7 (13862) T-STORE
13855 47		LD B, A
13856 CB,3A	T SHIFT	SRL D
13858 CB,1B		RR E
13860 10,FA		DJNZ, 250 (13856) T SHIFT
13862 CD,4C,31	T STORE	CALL 12620 STK DE U
13865 D1		POP DE
13866 C9		RET
13867 7E	T EXPONENT	LD A, (HL)
13868 D6,A0	X LARGE	SUB A, 160
13870 F0		RET P
13871 ED,44		NEG
13873 D5	NIL BYTES	PUSH DE
13874 EB		EX DE, HL
13875 2B		DEC HL
13876 47		LD B, A
13877 CB,38		SRL B
13879 CB,38		SRL B
13881 CB,38		SRL B
13883 28,05		JR Z, 5 (13890) BITS 0
13885 36,00	BYTE 0	LD (HL), 0
13887 2B		DEC HL
13888 10,FB		DJNZ, 251 (13885) BYTE 0
13890 E6,07	BITS 0	AND 7
13892 28,09		JR Z, 9 (13903) IX END
13894 47		LD A, 255 PREPARE MASK
13895 3E,FF		LD (HL), A
13897 CB,27	LESS MASK	SLA A
13899 10,FC		DJNZ, 252 (13897) LESS MASK
13901 A6		AND (HL)
13902 77		LD (HL), A
13903 EB	IX END	EX DE, HL
13904 D1		POP DE
13905 C9		RET
RESTACK TWO SUBROUTINE		
13906 CD,55,36	RESTACK TWO	CALL 13909 RESTACK SUB
13909 EB	RESTACK SUB	EX DE, HL
RESTACK SUBROUTINE		
13910 7E E TO FP (RESTACK FP) (OFFSET 61(3D))		LD A, (HL)
13911 A7		AND A CLEAR FLAGS
13912 C0		RET NZ
13913 D5		PUSH DE
13914 CD,3D,31		CALL 12605 LD DE (GET INT)

13917 AF		XOR A CLEAR A & CARRY
13918 23		INC HL
13919 77		LD (HL), A
13920 2B		DEC HL
13921 77		LD (HL), A
13922 06,91		LD B, 145
13924 7A		LD A, D
13925 A7		AND A CLEAR FLAGS
13926 20,08		JR NZ, 8 (13936) NORMALIZE
13928 B3		OR E
13929 42		LD B, D
13930 28,10		JR Z, 16 (13948) LD #
13932 53		LD D, E
13933 58		LD E, B
13934 06,89		LD B, 137
13936 EB	RS NORMALIZE	EX DE,HL
13937 05	RS LOOP	DEC B
13938 29		ADD HL, HL
13939 30,FC		JR NC, 252 (13937) RS LOOP
13941 CB,09		RRC C
13943 CB,1C		RR H
13945 CB,1D		RR L
13947 EB		EX DE,HL
13948 2B	LD #	DEC HL
13949 73		LD (HL), E
13950 2B		DEC HL
13951 72		LD (HL), D
13952 2B		DEC HL
13953 70		LD (HL), B
13954 D1		POP DE
13955 C9		RET

FLOATING POINT CALCULATOR

CONSTANT TABLE

13956 00,B0,00	STK 0	00,00,00,00,00
13959 40,B0,00,01	STK 1	00,00,01,00,00
13963 30,00	STK 1/2	80,00,00,00,00
13965 F1,49,0F,DA,A2	STK PI/2	81,49,0F,DA,A2
13970 40,B0,00,0A	STK 10	00,00,0A,00,00

FLOATING POINT ADDRESS TABLE

ADDR	OFFSET#	JUMP ADDRESS	FUNCTION
13974	00(00)	AA,3A (15018)	JP IF TRUE
13976	01(01)	FB,37 (14331)	EXCHANGE
13978	02(02)	60,37 (14176)	DELETE
13980	03(03)	CE,33 (13262)	SUBTRACT
13982	04(04)	89,34 (13449)	TIMES
13984	05(05)	6E,35 (13678)	DIVIDE
13986	06(06)	6C,3C (15486)	TO THE
13988	07(07)	36,39 (14655)	OR
13990	08(08)	3F,39 (14655)	AND
13992	09(09)	56,39 (14678)	# =< #
13994	10(0A)	56,39 (14678)	# => #
13996	11(0B)	56,39 (14678)	# <> #
13998	12(0C)	56,39 (14678)	# > #

14000	13(0D)	56,39	(14678)	# < #
14002	14(0E)	56,39	(14678)	# = #
14004	15(0F)	D3,33	(13265)	ADD
14006	16(10)	48,39	(14664)	\$ AND #
14008	17(11)	56,39	(14678)	\$ =<
14010	18(12)	56,39	(14678)	\$ =>
14012	19(13)	56,39	(14678)	\$ <>
14014	20(14)	56,39	(14678)	\$ >
14016	21(15)	56,39	(14678)	\$ <
14018	22(16)	56,39	(14678)	\$ =
14020	23(17)	B7,39	(14775)	STRING ADD
14022	24(18)	F9,39	(14841)	VAL\$
14024	25(19)	D7,38	(14551)	USR\$
14026	26(1A)	60,3A	(14944)	READ IN
14028	27(1B)	2D,38	(14381)	NEGATE
14030	28(1C)	84,3A	(14980)	CODE
14032	29(1D)	F9,39	(14841)	VAL
14034	30(1E)	8F,3A	(14991)	LEN
14036	31(1F)	D0,3B	(15312)	SIN
14038	32(20)	C5,3B	(15301)	COS
14040	33(21)	F5,3B	(15349)	TAN
14042	34(22)	4E,3C	(15438)	ASN
14044	35(23)	5E,3C	(15456)	ACS
14046	36(24)	5D,3B	(15357)	ATN
14048	37(25)	2E,3B	(15150)	LN
14050	38(26)	DF,3A	(15071)	EXP
14052	39(27)	CA,3A	(15050)	INT
14054	40(28)	65,3C	(15461)	SQR
14056	41(29)	51,38	(14417)	SGN
14058	42(2A)	29,38	(14377)	ABS
14060	43(2B)	6B,38	(14443)	PEEK
14062	44(2C)	64,38	(14436)	IN
14064	45(2D)	72,38	(14450)	URS #
14066	46(2E)	3A,3A	(14906)	STR\$
14068	47(2F)	E4,39	(14820)	CHR\$
14070	48(30)	1C,39	(14620)	NOT
14072	49(31)	7F,37	(14195)	DUPLICATE (MOVE FP)
14074	50(32)	BB,3A	(15035)	N MOD M (INT DIV)
14076	51(33)	A1,3A	(15009)	JUMP
14078	52(34)	85,37	(14213)	STK DATA
14080	53(35)	95,3A	(14997)	DJNZ
14082	54(36)	21,39	(14625)	TEST <0
14084	55(37)	14,39	(14621)	TEST >0
14086	56(38)	B6,3A	(15030)	END FP
14088	57(39)	9E,3B	(15262)	GET ARG (ANGLE)
14090	58(3A)	D3,35	(13779)	TRUNCATE
14092	59(3B)	61,37	(14177)	FP CALC 2
14094	60(3C)	0D,31	(12557)	xEy
14096	61(3D)	56,36	(13910)	E TO FP (RESTACK) FLOAT
14098		08,38	(14344)	SERIES GEN 86H,88H,8CH(06,08,0C)
14100		DA,37	(14298)	STK CONS A0=0,A1=1,A2=1/2,A3=PI/2
14102		EC,37	(14316)	STORE IN MEM (C0-C5) A4=10
14104		CE,37	(14286)	GET MEM (E0-E5)

CALCULATE SUBROUTINE

14106	CD,DA,39	FF CALC	CALL 14810 STK POINTERS
14109	78	GEN ENT-1	LD B, A
14110	32,67,5C		LD (23655) 0, A BREG
14113	D9	GEN ENT-2	EXX
14114	E3		EX (SP), HL
14115	D9		EXX
14116	ED,53,65,5C	REENTRY	LD (23653), DE STK END
14120	D9		EXX
14121	7E		LD A, (HL)
14122	23		INC HL
14123	E5	SCAN ENT	PUSH HL
14124	A7		AND A CLEARFLAGS
14125	F2,3F,37		JP P, 14143 1ST 61
14128	57		LD D, A
14129	E6,60		AND 96 SAVE BITS 5 & 6
14131	0F		RRC A MOVE DOWN TO BITS 1 & 2
14132	0F		RRC A
14133	0F		RRC A
14134	0F		RRC A
14135	C6,7C		ADD A, 124
14137	6F		LD L, A
14138	7A		LD A, D
14139	E6,1F		AND 31 MASK 5 LOW BITS
14141	18,0E		JR 14 (14157) ENTER TABLE
14143	FE,18	1ST 61	CP 24
14145	30,08		JR NC, 8 (14155) DOUBLE A
14147	D9		EXX
14148	01,FB,FF		LD BC, 65531 = -5
14151	54		LD D, H
14152	5D		LD E, L
14153	09		ADD HL, BC
14154	D9		EXX
14155	07	DOUBLE A	RLC A
14156	6F		LD L, A
14157	11,96,36	ENTER TABLE	LD DE, 13974 ADDR TABLE
14160	26,00		LD H, 0
14162	19		ADD HL, DE
14163	5E		LD E, (HL)
14164	23		INC HL
14165	56		LD D, (HL)
14166	21,24,37		LD HL, 14116 REENTER
14169	E3		EX (SP), HL
14170	D5		PUSH DE
14171	D9		EXX
14172	ED,4B,66,5C		LD BC, (23654) B REG/HI STK BYTE
DELETE SUBROUTINE			
14176	C9	DELETE	RET
SINGLE OPERATION SUBROUTINE			
14177	F1	FF CALC 2(OFFSET 59(3B))	POP AF
14178	3A,67,5C		LD A, (23655) B REG
14181	D9		EXX
14182	18,3C		JR 195 (14123) SCAN ENTRANCE

TEST 5 SPACES SUBROUTINE

14184 D5	TEST 5 SPACES	PUSH DE
14185 E5		PUSH HL
14186 01,05,00		LD BC, 5
14189 CD,BB,1F		CALL 8123 CHECK SIZE
14192 E1		POP HL
14193 D1		POP DE
14194 C9		RET

STACK NUMBER SUBROUTINE

14195 ED,5B,65,5C	STK MEM	LD DE, (23653) STK BOTTOM
14199 CD,7F,37		CALL 14207 DUPLICATE
14202 ED,53,65,5C		LD (23653), DE
14206 C9		RET

MOVE A FLOATING POINT NUMBER SUBROUTINE

14207 CD,68,37	DUPLICATE	CALL 14184 TEST 5 SPACE
14210 ED,B0 (OFFSET 49(31))		LDIR
14212 C9		RET

STACK LITERALS SUBROUTINE

14213 62	STK DATA (OFFSET 52(34))	LD H, D
14214 6B		
14215 CD,68,37	STK CONST	CALL 14184 TEST 5 SPACE
14218 D9		EXX
14219 E5		PUSH HL
14220 D9		EXX
14221 E3		EX (SP), HL
14222 C5		PUSH BC
14223 7E		LD A, (HL)
14224 E6,C0		AND 192 SAVE 2 HIGH BITS
14226 07		RRC A
14227 07		RRC A
14228 4F		LD C, A
14229 0C		INC C
14230 7E		LD A, (HL)
14231 E6,3F		AND 63 MASK 5 LOW BITS
14233 20,02		JR NZ, 2 (14237) FORM EXPONENT
14235 23		INC HL
14236 7E		LD A, (HL)
14237 C6,50	FORM EXP	ADD A, 80
14239 12		LD (DE), A
14240 3E,05		LD A, 5
14242 91		SUB C
14243 23		INC HL
14244 13		INC DE
14245 06,00		LD B, 0
14247 ED,B0		LDIR
14249 C1		POP BC
14250 E3		EX (SP), HL
14251 D9		EXX
14252 E1		POP HL
14253 D9		EXX
14254 47		LD B, A
14255 AF		XOR A CLEAR A & CARRY

```

14256 05          STK ZEROS      DEC B
14257 C8          RET Z
14258 12          LD (DE), A
14259 13          INC DE
14260 18,FA       JR 250 (14256) STK ZEROS

```

SKIP CONSTANTS SUBROUTINE

```

14262 A7          SKIP CONSTANTS  AND A CLEAR FLAGS
14263 C8          SKIP NEXT      RET Z
14264 F5          PUSH AF
14265 D5          PUSH DE
14266 11,00,00    LD DE, 0
14269 CD,87,37   CALL 14215 STK CONSTANTS
14272 D1          POP DE
14273 F1          POP AF
14274 3D          DEC A
14275 18,F2       JR 242 SKIP NEXT

```

MEMORY LOCATION SUBROUTINE

```

14277 4F          LOC MEM        LD C, A
14278 07          RLC A
14279 07          RLC A      X4
14280 81          ADD A, C
14281 4F          LD C, A
14282 06,00       LD B, 0
14284 09          ADD HL, BC
14285 C9          RET

```

GET FROM MEMORY AREA SUBROUTINE (E0-E5)

```

14286 D5 GET FROM MEM (OFFSET 65(41)) PUSH DE
14287 2A,68,5C    LD HL, (23656) MEM
14290 CD,C5,37   CALL 14277 LOC MEM
14293 CD,7F,37   CALL 14207 DUPLICATE
14296 E1          POP HL
14297 C9          RET

```

STACK A CONSTANT SUBROUTINE

```

14298 62 STK CONSTANT(OFFSETS A0-A4) LD H, D
14299 6B          LD L, E
14300 D9          EXX
14301 E5          PUSH HL
14302 21,84,36    LD HL, 13956 CONSTANT TABLE
14305 D9          EXX
14306 CD,B6,37    CALL 14262 SKIP CONSTANT
14309 CD,87,37   CALL 14215 STK CONSTANT
14312 D9          EXX
14313 E1          POP HL
14314 D9          EXX
14315 C9          RET

```

STORE IN MEMORY AREA SUBROUTINE

```

14316 E5 STORE MEM (OFFSETS C0-C5) PUSH HL
14317 EB          EX DE, HL
14318 2A,68,5C    LD HL, (23656) MEM
14321 CD,C5,37   CALL 14277 LOC MEM

```



```

14324 EB          ED DE, HL
14325 CD,7F,37    CALL 14207 DUPLICATE
14328 EB          EX DE, HL
14229 E1          POP HL
14330 C9          RET

```

EXCHANGE SUBROUTINE

```

14331 06,05 EXCHANGE(OFFSET 1) LD B, 5 COUNT 5
14333 1A          SWAP BYTE LD A, (DE)
14334 1E          LD C, (HL)
14335 EB          EX DE, HL
14336 12          LD (DE), A
14337 71          LD (HL), C
14338 23          INC HL
14339 13          INC DE
14340 10,F7       DJNZ, 247 SWAP BYTE
14342 EB          EX DE, HL
14343 C9          RET

```

SERIES GENERATOR SUBROUTINE

```

14344 47 SERIES GENERATOR LD B, A
14345 CD,1D,37 (OFFSETS 86,88,8C) CALL 14109 GEN ENT-1(=RST40)
14348 31          DUPLICATE
14349 0F          ADD
14350 C0          STK TO MEM 0
14351 02          DELETE
14352 A0          STK 0
14353 C2          STK TO MEM 2
14354 31          G LOOP DUPLICATE
14355 E0          GET MEM 0
14356 04          MULTIPLY
14357 E2          GET MEM 2
14358 C1          STK TO MEM 1
14359 03          SUBTRACT
14360 38          END FP
14361 CD,85,37    CALL 14213 STK DATA
14364 CD,21,31    CALL 14113 GEN ENT-2 (=RST40)
14367 0F          ADD
14368 01          EXCHANGE
14369 C2          STK TO MEM 0
14370 02          DELETE
14371 35,EE       DJNZ, 238 (14354) G LOOP
14373 E1          GET MEM 0
14374 03          SUBTRACT
14375 38          END FP
14376 C9          RET

```

ABSOLUTE MAGNITUDE FUNCTION

```

14377 06,FF ABS(OFFSET 42(2A) LD B, 255
14379 18,06       JR 6 (14387) NEG TEST

```

UNARY MINUS OPERATION

```

14381 CD,04,39 NEGATE(OFFSET 27(1B) CALL 14596 TEST 0
14384 D8          RET Z
14385 06,00       LD B, 0

```

```

14387 7E          NEG TEST    LD A, (HL)
14388 A7          AND A CLEAR FLAGS
14389 28,0B       JR Z, 11 (14402) INT CASE
14391 23          INC HL
14392 78          LD A, B
14393 E6,80       AND 128     SAVE HIGH BIT
14395 B6          OR (HL)
14396 17          RL A
14397 3F          CCF
14398 1F          RR A
14399 77          LD (HL), A
14400 2B          DEC HL
14401 C9          RET
14402 D5          INT CASE    PUSH DE
14403 E5          PUSH HL
14404 CD,3D,31    CALL 12605 LD DE (GET INT)
14407 E1          POP HL
14408 78          LD A, B
14409 B1          OR C        BC=0?
14410 2F          CPL
14411 4F          LD C, A
14412 CD,4C,31    CALL 12620 STK DE-S (INT STORE)
14415 D1          POP DE
14416 C9          RET

```

SIGNUM FUNCTION

```

14417 CD,04,39    SGN(OFFSET 44(2C)) CALL 14596 TEST 0
14420 D8          RET C
14421 D5          PUSH DE
14422 11,01,00    LD DE, 1
14425 23          INC HL
14426 CB,16       RL (HL)
14428 2B          DEC HL
14429 9F          SBC A, A
14430 4F          LD C, A
14431 CD,4C,31    CALL 12620 ST DE-S (INT STORE)
14434 D1          POP DE
14435 C9          RET

```

IN FUNCTION

```

14436 CD,23,1F    IN(OFFSET 44(2C)) CALL 7971 FIX-U(FIND INT)
14439 ED,78       IN A, (C)
14441 18,04       JR 4 (14447) PEEK STK

```

PEEK FUNCTION

```

14443 CD,23,1F    PEEK (OFFSET 43(2B)) CALL 7971 FIX-U(FIND INT)
14446 0A          LD A, (BC)
14447 CD,23,30    PEEK STK   JP 12518 STK A

```

USR FUNCTION

```

14450 CD,23,1F    USR(OFFSET 45(2D)) CALL 7971 FIX-U(FIND INT)
14453 CD,8E,38    CALL 14478 CK SYS CONF
14456 21,82,38    LD HL, 14466 USR BANK
14459 E5          PUSH HL    A RETURN
14460 21,E9,30    LD HL, 12521 STK BC

```

14463 E5
14464 C5
14465 C9

CALL USR BANK FUNCTION

14466 F1 GET USR BANK
14467 3C
14468 C8
14469 C5
14470 01,00,FF
14473 CD,99,64
14476 C1
14477 C9

USR BANK FUNCTION

14478 2A,BC,5C CK SYS CONF
14481 23
14482 7E
14483 FE,02
14485 20,2E
14487 23
14488 23
14489 23
14490 78
14491 CB,7F
14493 28,26
14495 E6,06
14497 28,1B
14499 D6,04
14501 FA,B7,38
14504 28,06
14506 7E
14507 FA,C5,38
14510 18,1B
14512 7E CK A-6
14513 CB,77
14515 28,16
14517 18,06
14519 7E CK A-5
14520 CB,6F
14522 28,0F
14524 18,07
14526 7E CK A-4
14527 CB,67
14529 28,08
14531 18,00
14533 E1 BANK 255
14534 3E,FF
14536 FS
14537 E5
14538 C9
14539 E1 USR BANK
14540 FS
14541 E5
14542 C5

PUSH HL A RETURN
PUSH BC A RETURN
RET AS ABOVE 3 DIFFERENT ONES

POP AF
INC A
RET Z ELSE CHANGE BANKS
PUSH BC
LD B, 255 BANK #
CALL 25753 BANK ENABLE
POP BC
RET

LD HL, (23740) SYS CONF TABLE ADD
INC HL
LD A, (HL) 2ND BYTE
CP 2
JR NZ, 46 (14533) BANK 255
INC HL
INC HL
INC HL
LD A, B
BIT 7, A
JR Z, 38 (14533) BANK 255
AND 6 SAVE BITS 1 & 2
JR Z, 27 (14526) CK A-4
SUB 4
JP N, 14519 CK A-5
JR Z, 6 (14512) CK A-6
LD A, (HL) DO IF BIT 2 ON
JP N 14533 BANK 255
JR 27 (15539) USR BANK
LD A, (HL)
BIT 6, A
JR Z, 22 (14539) USR BANK
JR 14 (14533) BANK 255
LD A, (HL)
BIT 5, A
JR Z, 15 (14539) URS BANK
JR 7 (14533) BANK 255
LD A, (HL)
BIT 4, A
JR Z, 8 (14539) URS BANK
JR 0 (14533) BANK 255
POP HL
LD A, 255
PUSH AF
PUSH HL
RET
POP HL
PUSH AF SAVE REGISTERS
PUSH HL
PUSH BC

14543 4F	LD C, A
14544 .06,00	LD B, 0
14546 CD,99,64	CALL 25753 BANK ENABLE
14549 C1	POP BC
14550 C9	RET

USR STRING FUNCTION

14551 CD,AF,2F URS\$(OFFSET 25(19))	CALL 12207 GET PARAM
14554 0B	DEC BC
14555 78	LD A, B
14556 B1	OR C BC=0?
14557 20,23	JR NZ, 35 (14595) ERR A
14559 1A	LD A, (DE)
14560 CD,4B,30	CALL 12363 ALPHA?
14563 38,09	JR C, 9 (14574) URS RANGE
14565 D6,90	SUB 144 UDC?
14567 38,19	JR C, 25 (14594) ERR A
14569 FE,15	CP 21
14571 30,15	JR NC, 21(14594) ERR A (TOKEN)
14573 3C	INC A
14574 3D	DEC A
14575 87	ADD A, A
14576 87	ADD A, A
14577 87	ADD A, A
14578 FE,A8	CP 168
14580 30,0C	JR NC, 12 (14594) ERR A
14582 ED,4B,7B,5C	LD BC, (23675) UDG TABLE
14586 81	ADD A, C
14587 4F	LD C, A
14588 30,01	JR NC, 1 (14591) USR STACK
14590 04	INC B
14591 C3,E9,30	JP 12521 STK BC
14594 CF	RST 8 ERROR
14595 09	A Invalid argument

TEST ZERO SUBROUTINE

14596 E5	TEST 0	PUSH HL
14597 C5		PUSH BC
14598 47		LD B, A
14599 7E		LD A, (HL) ADD ALL BYTES TOGETHER
14600 23		INC HL
14601 B6		OR (HL)
14602 23		INC HL
14603 B6		OR (HL)
14604 23		INC HL
14605 B6		OR (HL)
14606 78		LD A, B
14607 C1		POP BC
14608 E1		POP HL
14609 C0	NOT 0	RET NZ
14610 37		SCF
14611 C9		RET

GREATER THAN ZERO OPERATION

14612 CD,04,39	TEST >0(OFFSET 55(37))	CALL 14596 TEST 0
----------------	------------------------	-------------------

14615 D8	RET C	WAS EXACTLY ZERO
14616 3E,FF	LD A, 255	+ #
14618 18,06	JR 6 (14626)	SIGN TO C

NOT FUNCTION

14620 CD,04,39	NOT(OFFSET 48(30))	CALL 14596	TEST 0
14623 18,05	JR 5 (14630)	FP 0/1	

LESS THAN ZERO OPERATION

14625 AF	TEST <0 (OFFSET 54(36))	XOR A	CLEAR A & CARRY
----------	-------------------------	-------	-----------------

14626 23	SIGN TO C	INC HL
14627 AE		XOR (HL)
14628 2B		DEC HL
14629 07		RLC A

ZERO OR ONE SUBROUTINE (FOR AND/OR/NOT)

14630 E5	FP 0 OR 1	PUSH HL
14631 3E,00	LD FP-0	LD A, 0
14633 77		LD (HL), A
14634 23		INC HL
14635 77		LD (HL), A
14636 23		INC HL
14637 17		RL A
14638 77		LD (HL), A
14639 1F		RR A
14640 23		INC HL
14641 77		LD (HL), A
14642 23		INC HL
14643 77		LD (HL), A
14644 E1		POP HL
14645 C9		RET

OR OPERATION

14646 EB	OR (OFFSET 7)	EXX
14647 CD,04,39		CALL 14596
14650 EB		EXX
14651 D8		RET C
14652 37		SCF
14653 18,E7		JR 231 (14630)
		FP 0 OR 1

NUMBER AND NUMBER OPERATION

14655 EB	AND (OFFSET 8)	EX DE, HL
14656 CD,04,39		CALL 14596
14659 EB		EX DE, HL
14660 D0		RET NC
14661 A7		NOT MATCH
14662 18,DE		AND A
		CLEAR FLAGS
		JR 222 (14630)
		FP 0 OR 1

STRING AND NUMBER OPERATION

14664 EB	STR & # (OFFSET 16(10))	EX DE, HL
14665 CD,04,39		CALL 14596
14668 EB		EX DE, HL
14669 D0		RET NC
14670 D5		NOT MATCH
		PUSH DE

14671 1B	DEC DE
14672 AF	XOR A CLEAR A
14673 12	LD (DE), A
14674 1B	DEC DE
14675 12	LD (DE), A
14676 D1	POP DE
14677 C9	RET

COMPARISON OPERATION

14678 78	# AND # (OFFSET 9-14	LD A, B
14679 D6,08	& 17-22)	SUB B
14681 CB,57		BIT 2, A
14683 20,01		JR NZ, 1 (14686) EX OR NOT
14685 3D		DEC A
14686 0F	EX OR NOT	RRC A
14687 30,08		JR NC, 8 (14697) # OR \$
14689 F5		PUSH AF
14690 E5		PUSH HL
14691 CD,FB,37		CALL 14331 EXCHANGE
14694 D1		POP DE
14695 EB		EX DE, HL
14696 F1		POP AF
14697 CB,57	# OR \$	BIT 2, A
14699 20,07		JR NZ, 7 (14708) STRINGS
14701 0F		RRC A
14702 F5		PUSH AF
14703 CD,CE,33		CALL 13262 SUBTRACT
14706 18,33		JR 51 (14759) END TESTS
14708 0F	STRINGS	RRC A
14709 F5		PUSH AF
14710 CD,AF,2F		CALL 12207 GET PARAM
14713 D5		PUSH DE
14714 C5		PUSH BC
14715 CD,AF,2F		CALL 12207 GET PARAM
14718 E1		POP HL
14719 7C	BYTE COMP	LD A, H
14720 B5		OR L HL = 0?
14721 E3		EX (SP), HL
14722 78		LD A, B
14723 20,0B		JR NZ, 11 (14736) 2ND HIGH
14725 B1		OR C
14726 C1	2ND LOW	POP BC
14727 28,04		JR Z, 4 (14733) BOTH NULL
14729 F1		POP AF
14730 3F		CCF
14731 18,26		JR 22 (14755) STR TEST
14733 F1	BOTH NULL	POP AF
14734 18,13		JR 19 (14755) STR TEST
14736 B1	2ND HIGH	OR C
14737 28,0D		JR Z, 13 (14752) 1ST LOW
14739 1A		LD A, (DE)
14740 96		SUB (HL)
14741 38,09		JR C, 9 (14752) 1ST LOW
14743 20,ED		JR NZ, 237 (14726) 2ND LOW
14745 0B		DEC BC

14746 13		INC DE
14747 23		INC HL
14748 E3		EX (SP), HL
14749 2B		DEC HL
14750 18,DF		JR 223 (14719) BYTE COMP.
14752 C1	1ST LOW	POP BC
14753 F1		POP AF
14754 A7		AND A CLEAR FLAGS
14755 F5	STR TEST	PUSH AF
14756 EF		RST 40 FF CALC
14757 A0		STK 0
14758 38		END FP
14759 F1	END TEST	POP AF
14760 F5		PUSH AF
14761 CD,1C,39		CALL C, 14620 NOT
14764 F1		POP AF
14765 F5		PUSH AF
14766 D4,14,39		CALL NC, 14612 TEST 0
14769 F1		POP AF
14770 OF		RRC A
14771 D4,1C,39		CALL NC, 14620 NOT
14774 C9		RET

STRING CONCATENATION OPERATION

14775 CD,AF,2F STR ADD (OFFSET	23(17))	CALL 12207 POP STR
14778 D5		PUSH DE
14779 C5		PUSH BC
14780 CD,AF,2F		CALL 12207 POP STR
14783 E1		POP HL
14784 E5		PUSH HL
14785 D5		PUSH DE
14786 C5		PUSH BC
14787 09		ADD HL, DE
14788 44		LD B, H
14789 4D		LD C, L
14790 F7		RST 48 MAKE BC SPACES
14791 CD,70,2E		CALL 11888 PUSH STR
14794 C1		POP BC
14795 E1		POP HL
14796 78		LD A, B
14797 B1		OR C BC=0?
14798 28,02		JR Z, 2 (14802) OTHER STR
14800 ED,B0		LDIR
14802 C1	OTHER STR	POP BC
14803 E1		POP HL
14804 78		LD A, B
14805 B1		OR C BC= 0?
14806 28,02		JR Z, 2 (14810) STK POINTERS
14808 ED,B0		LDIR

STACK POINTERS SUBROUTINE

14810 2A,65,5C	STK POINTERS	LD HL, (23653) STK END
14813 11,FB,FF		LD DE, 65531 = -5
14816 E5		PUSH HL
14817 19		ADC HL, DE

14818 D1 POP DE
14819 C9 RET

CHR\$ FUNCTION

14820 CD,93,31 CHR\$ (OFFSET 47(2F)) CALL 12691 FP TO A
14823 38,0E JR C, 14 (14839) ERR B
14825 20,0C JR NZ, 12 (14839) ERR B
14827 F5 PUSH AF
14828 01,01,00 LD BC, 1
14831 F7 RST 48 MAKE BC SPACES
14832 F1 POP AF
14833 12 LD (DE), A
14834 CD,70,2E CALL 11888 PUSH STR
14837 EB EX DE,HL
14838 C9 RET
14839 CF ERR B RST 8 ERROR
14840 0A B lineger out of range

VAL AND VAL\$ FUNCTIONS

14841 2A,5D,5C VAL & VAL\$ LD HL, (23645) CHAR ADDR
14844 E5 (OFFSETS 29(1D)&24(18)) PUSH HL
14845 78 LD A, B
14846 C6,E3 ADD A, 227 (VAL +FB)
14848 9F SBC A, A
14849 F5 PUSH AF
14850 CD,AF,2F CALL 12207 POP STR
14853 D5 PUSH DE
14854 03 INC BC
14855 F3 RST 48 MAKE BC SPACES
14856 E1 POP HL
14857 ED,53,5D,5C LD (23645), DE CHAR ADDR
14861 D5 PUSH DE
14862 ED,B0 LDIR
14864 EB EX DE, HL
14865 2B DEC HL
14866 36,0D LD (HL), 13 ENTER
14868 FD,CB,01,BE RES 7, (IY+1) SYNTAX ON
14872 CD,54,28 CALL 10324 EXPRESSION
14875 DF RST 24 GET CHAR
14876 FE,03 CP 13 ENTER?
14878 20,07 JR NZ, 7 (14887) SYN ERR
14880 E1 END OF LINE POP HL
14881 F1 POP AF
14882 FD,AE,01 XOR (IY+1)
14885 E6,40 AND 64 SET BIT 5
14887 C2,ED,1B SYN ERR JP NZ 7149 SYN ERR
14890 22,5D,5C LD (23645), HL CHAR ADDR
14893 FD,CB,01,FE SET 7, (IY+1) LINE OK
14897 CD,54,28 CALL 10324 EXPRESSION
14900 E1 POP HL
14901 22,5D,5C LD (23645), HL RESTORE CHAR ADDR
14904 18,A0 JR 160 (14810) STK POINTERS

STR\$ FUNCTION

14906 01,01,00 STR\$(OFFSET 46(2E)) LD BC, 1

14909 F7	RST 48 MAKE BC SPACES
14910 22,5B,5C	LD (23643), HL K CUR SAVE
14913 E5	PUSH HL
14914 2A,51,5C	LD HL, (23633) CURRENT CHAN
14917 E5	PUSH HL
14918 3E,FF	LD A, 255 CHAN R
14920 CD,30,12	CALL 4656 SELECT CHAR
14923 CD,A1,31	CALL 12705 OUTPUT #
14926 E1	POP HL
14927 CD,48,12	CALL 4680 SEL HL CHAN FLAG
14930 D1	POP DE
14931 2A,5B,5C	LD HL, (23643) K CUR
14934 A7	AND A CLEAR FLAGS
14935 ED,52	SBC HL, DE
15937 44	LD B, H LENGTH TO BC
14938 4D	LD C, L
14939 CD,70,2E	CALL 11888 PUSH STR
14942 EB	EX DE, HL
14943 C9	RET

READ IN SUBROUTINE

14944 CD,1E,1F READ (OFFSET 26(1A))	CALL 7966 FIX-U1 (FIND SIN #
14947 FE,10	CP 16
14949 D2,29,1F	JP NC, 7977 ERR B
14952 2A,51,5C	LD HL, (23633) CURRENT CHAN
14955 E5	PUSH HL
14956 CD,30,12	CALL 4556 SELECT CHAN
14959 CD,E1,11	CALL 4577 INPUT CHAR
14962 01,00,00	LD BC, 0
14965 30,0C	JR NC, 3 (14970) READ STORE
14967 0C	INC C
14968 F7	RST 48 MAKE BC SPACES
14969 12	LD (DE), A
14970 CD,70,2E READ STORE	CALL 11888 PUSH STR
14973 E1	POP HL
14974 CD,48,12	CALL 4680 SEL HL CHAN FLAG
14977 C3,DA,39	JP 14810 STK POINTERS

CODE FUNCTION

14980 CD,AF,2F CODE (OFFSET 28(1C))	CALL 12207 POP STR
14983 78	LD A, B
14984 B1	OR B BC=0?
14985 28,01	JR Z, 1 (14988) STK CODE
14987 1A	LD A, (DE)
14988 C3,E6,30 STK CODE	JP 12518 STK A

LEN FUNCTION

14991 CD,AF,2F LEN(OFFSET 30(1E))	CALL 12207 POP STR
14994 C3,E9,30	JP 12521 STK A

DECREASE COUNTER SUBROUTINE

14997 D9 DJNZ (OFFSET 53(35))	EXX
14998 E5	PUSH HL
14999 21,67,5C	LD HL, 23655 AT B REG
15002 35	DEC (HL)

```

15003 E1          POP HL
15004 20,04       JR NZ, 4 (15010) JUMP-2
15006 23          INC HL
15007 D9          EXX
15008 C9          RET

```

JUMP ROUTINE

```

15009 D9 JUMP (OFFSET 51(33)) EXX
15010 5E          JUMP-2      LD E, (HL)
15011 7B          LD A, E
15012 17          RL A
15013 9F          SBC A, A
15014 57          NEW ADDR   LD D, A
15015 19          ADD HL, DE
15016 D9          EXX
15017 C9          RET

```

JUMP IF TRUE SUBROUTINE

```

15018 13 JUMP IF TRUE(OFFSET 0) INC DE
15019 13          INC DE
15020 1A          LD A, (DE)
15021 1B          DEC DE
15022 1B          DEC DE
15023 A7          AND A CLEAR FLAGS
15024 20,EF       JR NZ, 239 (15009) JUMP
15026 D9          EXX
15027 23          INC HL
15028 D9          EXX
15029 C9          RET

```

END FLOATING POINT CALCULATION SUBROUTINE

```

15030 F1 END FP(OFFSET 56(38)) POP AF
15031 D9          EXX
15032 E3          EX (SP), HL
15033 D9          EXX
15034 C9          RET

```

MODULUS SUBROUTINE

```

15035 EF INT DIVIDE (N MOD M) RST 40 FP CALC (MEM 0= M)
15036 C0 OFFSET 50(32))     STK TO MEM 0
15037 02          DELETE
15038 31          DUPLICATE
15039 E0          GET MEM 0
15040 05          DIVIDE
15041 27          INT
15042 E0          GET MEM 0
15043 01          EXCHANGE
15044 C0          STK TO MEM 0
15045 04          MULTIPLY
15046 03          SUBTRACT
15047 E0          GET MEM 0
15048 38          END FP
15049 C9          RET

```

INTEGER FUNCTION

15050	EF INT (OFFSET 39(27))	---	RST 40 FP CALC
15051	31		DUPLICATE
15052	36		TEST <0
15053	00,04		JUMP IF TRUE (15058) X-NEG
15055	3A		TRUNCATE
15056	38		END FP
15057	C9		RET
15058	31	X-NEG	DUPLICATE
15059	3A		TRUNCATE
15060	C0		STK TO MEM 0
15061	03		SUBTRACT
15062	E0		GET MEM 0
15063	01		EXCHANGE
15064	30		NOT
15065	00,03		JUMP IF TRUE 4 (15069) EXIT
15067	A1		STK TO MEM 0
15068	03		SUBTRACT
15069	38	EXIT	END FP
15070	C9		RET

EXPONENTIAL FUNCTION

15071	EF EXP (OFFSET 33(26))		RST 40 FP CALC
15072	3D		E TO FP
15073	34		STK DATA
15074	F1,38,AA,3B,29		EXP 81,+38,+AA,+3B,+29
15079	04		MULTIPLY
15080	31		DUPLICATE
15081	27		INT
15082	C3		STK TO MEM 3
15083	03		SUBTRACT
15084	31		DUPLICATE
15085	0F		ADD
15086	A1		STK 1
15087	03		SUBTRACT
15088	88		SERIES 8
15089	13,36	1.	EXP 63,+36,(+00,+00,+00)
15091	58,65,66	2.	EXP 68,+65,+66,(+00,+00)
15094	9D,78,65,40	3.	EXP 6D,+78,+65,+40,(+00)
15098	A2,60,32,C9	4.	EXP 72,+60,+32,+C9,(+00)
15102	E7,21,F7,AF,24	5.	EXP 77,+21,+F7,+AF,+24
15107	EB,2F,B0,B0,14	6.	EXP 7B,+2F,+B0,+B0,+14
15112	EE,7E,BB,94,58	7.	EXP 7E,+7E,+BB,+94,+58
15117	F1,3A,7E,F8,CF	8.	EXP 81,+3A,+7E,+F8,+CF
15122	E3		GET MEM 3
15123	38		END FP
15124	CD,93,31		CALL 12691 FPTO A
15127	20,07		JR NZ, 7 (15136) N NEG
15129	38,03		JR C, 3 (15134) ERR 6
15131	86		ADD A, (HL)
15132	30,09		JR NC, 9 (15143) RESULT OK
15134	CF	ERR 6	RST 8 ERROR
15135	05		6 Number too big
15136	38,07	N NEG	JR C, 7 (15145) RESULT 0

15138 96		SUB (HL)
15139 30,04		JR NC, 4 (15145) RESULT 0
15141 ED,44		NEG
15143 77	RESULT OK	LD (HL), A
15144 C9		RET
15145 EF	RESULT 0	RST 40 FP CALC
15146 02		DELETE
15147 A0		STK 0
15148 38		END FP
15149 C9		RET
NUTURAL LOGARITHM FUNCTION		
15150 EF LN (OFFSET 37(25))		RST 40 FP CALC
15151 3D		E TO FP
15152 31		DUPLICATE
15153 37		TEST >0
15154 00,04		JP IF TRUE 4 (15159) VALID
15156 38		END FP
15157 CF	ERR A	RST 8 ERROR
15158 09		A Invalid argument (NEGATIVE)
15159 A0	VALID	STK 0
15160 02		DELETE
15161 38		END FP
15162 7E		LD A, (HL) EXPONENT
15163 36,80		LD (HL), 128
15165 CD,E6,30		CALL 12518 STK A
15168 EF		STK DATA
15170 38,00		EXP 88, (+00,+00,+00,+00)
15172 03		SUBTRACT
15173 01		EXCHANGE
15174 31		DUPLICATE
15175 34		STK DATE
15176 F0,4C,CC,CC,CD		EXP 80,+4C,+CC,+CC,+CD
15181 03		SUBTRACT
15182 37		TEST >0
15183 00,08		JUMP IF TRUE 8 (15192) >8
15185 01		EXCHANGE
15186 A1		STK 1
15187 03		SUBTRACT
15188 01		EXCHANGE
15189 38		END FP
15190 34		INC (HL)
15191 EF		RST 40 FP CALC
15192 01	>8	EXCHANGE
15193 34		STK DATA
15194 F0,31,72,17,F8		EXP 80,+31,+72,+17,+F8
15199 04		MULTIPLY
15200 01		EXCHANGE
15201 A2		STK 1/2
15202 03		SUBTRACT
15203 A2		STK 1/2
15204 03		SUBTRACT
15205 31		DUPLICATE
15206 34		STK DATA
15207 32,20		EXP 82,+20, (+00,+00,+00)

15209 04	MULTIPLY
15210 A2	STK 1/2
15211 03	SUBTRACT
15212 8C	SERIES 12
15213 11, AC	1. EXP 61, +AC, (+00, +00, +00)
15215 14, 09	2. EXP 64, +09, (+00, +00, +00)
15217 56, DA, AF	3. EXP 66, +DA, +A5, (+00, +00)
15220 59, 30, C5	4. EXP 69, +30, +C5, (+00, +00)
15223 5C, 90, AA	5. EXP 6C, +90, +AA, (+00, +00)
15226 9E, 70, 6F, 61	6. EXP 6E, +70, +6F, +61, (+00)
15230 A1, CB, DA, 96	7. EXP 71, +CB, +DA, +96, (+00)
15234 A4, 31, 9F, B4	8. EXP 74, +31, +9F, +B4, (+00)
15238 E7, A0, FE, 5C, FC	9. EXP 77, +A0, +FE, +5C, +FC
15243 EA, 1B, 43, CA, 36	10. EXP 7A, +1B, +43, +CA, +36
15248 ED, A7, 9C, 7E, 5E	11. EXP 7D, +A7, +9C, +7E, +5E
15253 F0, 6E, 23, 80, 93	12. EXP 80, +6E, +23, +80, +93
15258 04	MULTIPLY
15259 0F	ADD
15260 38	END FP
15261 C9	RET

REDUCE ARGUMENT SUBROUTINE

15262 EF GET ARGUMENT(OFFSET 57(39)) RST 40 FP CALC	E TO FP
15263 3D	STK DATA
15264 34	EXP 7E, +22, +F9, +83, +63
15265 EE, 22, F9, 83, 6E	MULTIPLY
15270 04	DUPLICATE
15271 31	STK 1/2
15272 A2	ADD
15273 0F	INT
15274 27	SUBTRACT
15275 03	DUPLICATE
15276 31	ADD
15277 0F	DUPLICATE
15278 31	ADD
15279 0F	DUPLICATE
15280 31	ABS
15281 2A	STK 1
15282 A1	SUBTRACT
15283 03	DUPLICATE
15284 31	TEST >0
15285 37	STK TO MEM 0 RESULT OF TEST
15286 C0	JUMP IF TRUE 4 (15292) 2 PLUS
15287 00, 04	DELETE
15289 02	END FP
15290 38	RET
15291 C9	STK 1
15292 A1	SUBTRACT
15293 03	EXCHANGE
15294 01	TEST <0
15295 36	JUMP IF TRUE 2 (15299) Y NEG
15296 00, 02	NEGATE
15298 1B	END FP
15299 38	RET
15300 C9	

COSINE FUNCTION $\cos X = \sin(\pi X/2)$

```

15301 EF COS (OFFSET 32(20))      RST 40 FP CALC
15302 39                              GET ARGUMENT
15303 2A                              ABS
15304 A1                              STK 1
15305 03                              SUBTRACT
15306 E0                              GET MEM 0
15307 00,06                          JUMP IF TRUE 6 (15314) C-ENT
15309 1B                              NEGATE
15310 33,03                          JP 3 (15314) C-ENT
15312 EF SIN (OFFSET 31(1F))      RST 40 FP CALC
15313 39                              GET ARGUMENT
15314 31                              C-ENT      DUPLICATE
15315 31                              DUPLICATE
15316 04                              MULTIPLY
15317 31                              DUPLICATE
15318 0F                              ADD
15319 A1                              STK 1
15320 03                              SUBTRACT
15321 86                              SERIES 6
15322 14,E6                          1. EXP 64,+E6,(+00,+00,+00)
15324 5C,1F,0B                      2. EXP 6C,+1F,+0B,(+00,+00)
15327 A3,8F,38,EE                   3. EXP 73,+8F,+38,+EE,(+00)
15331 E9,15,63,BB,23               4. EXP 79,+15,+63,+BB,+23
15336 EE,92,0D,CD,ED               5. EXP 7E,+92,+0D,+CD,+ED
15341 F1,23,5D,1B,EA               6. EXP 81,+23,+5D,+1B,+EA
15346 04                              MULTIPLY
15347 38                              END FP
15348 C9                              RET

```

TAN FUNCTION $\tan X = \sin X / \cos X$

```

15349 EF TAN(OFFSET 33(21))      RST 40 FP CALC
15350 31                              DUPLICATE
15351 1F                              SIN
15352 01                              EXCHANGE
15353 20                              COS
15354 05                              DIVIDE
15355 38                              END FP
15359 C9                              RET

```

ARCTAN FUNCTION

```

15357 CD,56,36 ATN (OFFSET 36(24)) CALL 13910 E TO FP
15360 7E                              LD A, (HL)
15361 FE,81                           CP 81
15363 38,0E                          JR C, 14 (15379) SMALL
15365 EF                              RST 40 FP CALC
15366 A1                              STK 1
15367 1B                              NEGATE
15368 01                              EXCHANGE
15369 05                              DIVIDE
15370 31                              DUPLICATE
15371 36                              TEST < 0
15372 A3                              STK PI/2
15373 01                              EXCHANGE

```

15374 00,06		JUMP IF TRUE, 6 (15381) CASES
15376 1B		NEGATE
15377 33,03		JUMP 3 (15381) CASES
15379 EF	SMALL	RST 40 FP CALC
15380 A0		STK 0
15381 01	CASES	EXCHANGE
15382 31		DUPLICATE
15383 31		DUPLICATE
15384 04		MULTIPLY
15385 31		DUPLICATE
15386 0F		ADD
15387 A1		STK 1
15388 03		SUBTRACT
15389 8C		SERIES 12
15390 10,B2	1.	EXP 60,+B2,(+00,+00,+00)
15392 13,0E	2.	EXP 63,+0E,(+00,+00,+00)
15394 55,E4,8D	3.	EXP 65,+E4,+8D,(+00,+00)
15397 58,39,BC	4.	EXP 68,+39,+BC,(+00,+00)
15400 5B,9B,FD	5.	EXP 6B,+9B,+FD,(+00,+00)
15403 9E,00,36,75	6.	EXP 6E,+00,+36,+75,(+00)
15407 A0,DB,E8,B4	7.	EXP 70,+DB,+E8,+B4,(+00)
15411 63,42,C4	8.	EXP 73,+42,+C4,(+00,+00)
15414 E6,B5,09,36,BE	9.	EXP 76,+B5,+09,+36,+BE
15419 E9,36,73,1B,5D	10.	EXP 79,+36,+73,+1B,+5D
15424 EC,D8,DE,63,BE	11.	EXP 7C,+D8,+DE,+63,+BE
15429 F0,61,A1,B3,0C	12.	EXP 80,+61,+A1,+B3,+0C
15434 04		MULTIPLY
15435 0F		ADD
15436 38		END FP
15437 C9		RET

ARCSIN FUNCTION

15438 EF ASN (OFFSET 34(22))	RST 40 FP CALC
15439 31	DUPLICATE
15440 31	DUPLICATE
15441 04	MULTIPLY
15442 A1	STK 1
15443 03	SUBTRACT
15444 1B	NEGATE
15445 28	SQR
15446 A1	STK 1
15447 0F	ADD
15448 05	DIVIDE
15449 24	ATN
15450 31	DUPLICATE
15451 0F	ADD
15452 38	AND FP
15453 C9	RET

ARCCOS FUNCTION $ACN X = PI/2 - ASN X$

15454 EF ACN (OFFSET 35(23))	RST 40 FP CALC
15455 22	ASN
15456 A3	STK PI/2
15457 03	SUBTRACT
15458 1B	NEGATE

15459 38
15440 C9

END FP
RET

SQUARE ROOT SUBROUTINE

15461 EF SQR (OFFSET 40(28))
15462 31
15463 30
15464 00,1E
15466 A2
15467 38

RST 40 FP CALC
DUPLICATE
STK 1
JUMP IF TRUE 31 (15495) LAST
STK 1/2
END FP

EXPONENTATION OPERATION

15468 EF TO THE (OFFSET 6)
15469 01
15470 31
15471 30
15472 00,07
15474 25
15475 04
15476 38
15477 C3,DF,3A
15480 02
15481 31
15482 30
15483 00,09
15485 A0
15486 01
15487 37
15488 00,06
15490 A1
15491 01
15492 05
15493 02
15494 A1
15495 38
15496 C9

X=0

ONE

LAST

RST 40 FP CALC
EXCHANGE
DUPLICATE
NOT
JUMP IF TRUE, 7 (15480) X=0
LN
MULTIPLY
END FP
JP 15071 EXP
DELETE
DUPLICATE
NOT
JUMP IF TRUE, 9 (15493) ONE
STK 0
EXCHANGE
TEST >0
JUMP IF TRUE, 6 (15495) LAST
STK 1
EXCHANGE
DIVIDE
DELETE
STK 1
END FP
RET

TAPE MESSAGES

15497 80,53,74,61,72,74,20,
74,61,70,65,20,20,74,
68,65,6E,20,70,72,65,
73,73,20,61,6E,79,20,
6B,65,79,AE,0D
15530 50,72,6F,67,72,61,6D,
3A,A0,0D
15540 4E,75,6D,62,65,72,20,
61,72,72,61,79,3A,A0,
0D
15555 43,68,61,72,61,63,74,
65,72,20,61,72,72,61,
79,3A,A0,0D
15573 42,79,74,65,73,3A,A0

Start tape, then press any key.

Program:

Number array:

Character array:

Bytes:

15580-15615 FF UNUSED

CHARACTER TABLE

15616	00,00,00,00,00,00,00,00	(SPACE)
15624	00,10,10,10,10,00,10,00	!
15632	00,24,24,00,00,00,00,00	"
15640	00,24,7E,24,24,7E,24,00	#
15648	00,08,3E,28,3E,0A,3E,00	\$
15656	00,62,64,08,10,26,46,00	%
15664	00,10,28,10,2A,44,3A,00	&
15672	00,08,10,00,00,00,00,00	'
15680	00,04,08,08,08,08,04,00	(
15688	00,20,10,10,10,10,20,00)
15696	00,00,14,08,3E,08,14,00	*
15704	00,00,08,08,3E,08,08,00	+
15712	00,00,00,00,00,08,08,00	,
15720	00,00,00,00,3E,00,00,00	-
15728	00,00,00,00,00,18,18,00	.
15736	00,00,02,04,08,10,20,00	/
15744	00,3C,46,4A,52,62,3C,00	0
15752	00,18,28,08,08,08,3E,00	1
15760	00,3C,42,02,3C,02,3C,00	2
15768	00,3C,42,0C,02,42,3V,00	3
15776	00,08,18,28,48,7E,08,00	4
15784	00,7E,40,7C,02,42,3C,00	5
15792	00,3C,40,7C,42,42,3C,00	6
15800	00,7E,02,04,08,10,10,00	7
15808	00,3C,42,3C,42,42,3C,00	8
15816	00,3C,42,42,3E,02,3C,00	9
15824	00,00,00,10,00,00,10,00	:
15832	00,00,10,00,00,10,10,20	;
15840	00,00,04,08,10,08,04,00	<
15848	00,00,00,3E,00,3E,00,00	=
15856	00,00,10,08,04,08,10,00	>
15864	00,3C,42,04,08,00,08,00	?
15872	00,3C,4A,56,5E,40,3C,00	@
15880	00,3C,42,42,7E,42,42,00	A
15888	00,7C,42,7C,42,42,7C,00	B
15896	00,3C,42,40,40,42,3C,00	C
15904	00,78,44,42,42,44,78,00	D
15912	00,7E,40,7C,40,40,7E,00	E
15920	00,7E,40,7C,40,40,40,00	F
15928	00,3C,42,40,4E,42,3C,00	G
15936	00,42,42,7E,42,42,42,00	H
15944	00,3E,08,08,08,08,3E,00	I
15952	00,02,02,02,42,42,3C,00	J
15960	00,44,48,70,48,44,42,00	K
15968	00,40,40,40,40,40,7E,00	L
15976	00,42,66,5A,42,42,42,00	M
15984	00,42,62,52,4A,46,42,00	N
15992	00,3C,42,42,42,42,3C,00	O
16000	00,7C,42,42,7C,40,40,00	P
16008	00,3C,42,42,52,4A,3C,00	Q
16016	00,7C,42,42,7C,44,42,00	R
16024	00,3C,40,3C,02,42,3C,00	S
16032	00,FE,10,10,10,10,10,00	T
16040	00,42,42,42,42,42,3C,00	U

16048	00,42,42,42,42,24,18,00	V
16056	00,42,42,42,42,5A,24,00	W
16064	00,42,24,18,18,24,42,00	X
16072	00,82,44,28,10,10,10,00	Y
16080	00,7E,04,08,10,20,7E,00	Z
16088	00,0E,08,08,08,08,0E,00	[
16096	00,00,40,20,10,08,40,00	\
16104	00,70,10,10,10,10,70,00]
16112	00,10,38,54,10,10,10,00	^
16120	00,00,00,00,00,00,00,FF	_
16128	00,1C,22,78,20,20,7E,00	FOUND SIGN
16136	00,00,38,04,3C,44,3C,00	a
16144	00,20,20,3C,22,22,3C,00	b
16152	00,00,1C,20,20,20,1C,00	c
16160	00,04,04,3C,44,44,3C,00	d
16168	00,00,38,44,78,40,3C,00	e
16176	00,06,10,18,10,10,10,00	f
16184	00,00,3C,44,44,3C,04,38	g
16192	00,40,40,78,44,44,44,00	h
16200	00,10,00,30,10,10,38,00	i
16208	00,04,00,04,04,04,24,18	j
16216	00,20,28,30,30,28,24,00	k
16224	00,10,10,10,10,10,0C,00	l
16232	00,00,6C,92,92,92,92,00	m
16240	00,00,78,44,44,44,44,00	n
16248	00,00,38,44,44,44,38,00	o
16256	00,00,78,44,44,78,40,40	p
16264	00,00,3C,44,44,3C,04,06	q
16272	00,00,1C,20,20,20,20,00	r
16280	00,00,38,40,38,04,78,00	s
16288	00,10,38,10,10,10,0C,00	t
16296	00,00,44,44,44,44,38,00	u
16304	00,00,44,44,28,28,10,00	v
16312	00,00,92,92,92,92,6C,00	w
16320	00,00,44,28,10,28,44,00	x
16328	00,00,44,44,44,3C,04,38	y
16336	00,00,7C,08,10,20,7C,00	z
16344	00,0E,08,30,08,08,0E,00	{
16352	00,08,08,08,08,08,08,00	
16360	00,70,10,0C,10,10,70,00	}
16368	00,14,28,00,00,00,00,00	close "
16376	3C,42,99,A1,A1,99,42,3C	copywrite sign

16384-22527 DISPLAY FILE

22528-23295 ATTR FILE 1

23296-23551 PRINTER BUFFER

23552-23755 SYSTEM VARIABLE TABLE ACTIVE

23756-24297 RESERVED FOR MORE SYSTEM VARIABLES

SYSTEM CONFIGURATION TABLE (INITIAL SETUP)

24298 B6,00,B6,B6,B6,B6,B6,B6,00,B6,B6,B6,80

24311-24552 RESERVED FOR MORE DATA

24553-24575 USR BANK TABLE

24576-25087 MACHINE STACK

NOTE: TRANSFER DISPATCHER IN BOTTOM OF MACHINE STACK (STACK WORKS DOWN FROM 25087)

TRANSFER DISPATCHER

24576 3E,01	LD A, 1
24578 D3,F4	OUT (244), A
24580 DB,FF	IN A, (255)
24582 CB,FF	SET 7, A
24584 D3,FF	OUT (255), A
24586 21,00,10	LD HL, 4096 ADDR IN BANK 254
24589 11,00,62	LD DE, 25088 ADDR DESTINATION
24592 01,30,06	LD BC, 1584 LENGTH OF TRANSFER
24595 ED,B0	LDIR
24597 CB,BF	RES 7, A
24599 D3,FF	OUT (255), A
24601 AF	XOR A CLEAR A
24602 D3,F4	OUT (244), A
24604 C9	RET

AS LONG AS THIS PROGRAM HAS NOT BEEN OVERWRITTEN BY THE STACK IT CAN BE MODIFIED TO PUSH EROM ANY PLACE YOU WANT. DOING THE FOLLOWING SIMPLE PROGRAM IN BASIC WILL TRANSFER THE 1ST 4K OF EROM TO 60000 WHERE IT CAN BE READ

```

10 GO SUB 20: RANDOMISE USER 24576: GOSUB 20: STOP
20 FOR X = 24588 TO 24594:READ Y:POKE X,Y:NEXT X
30 RETURN
40 DATA 0,17,98,234,1,0,16
50 DATA 16,17,0,98,1,48,6

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FUNCTION DISPATCHER

NOTE: SOME SUBROUTINES OF THIS ROUTINE HAVE MAJOR ERRORS. DO NOT USE UNTIL OORRECTED. CORRECTIONS ARE OUTLINED IN TECNICAL MANUAL

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25088 DD,21,00,00 FUNCTION DISPATCHER LD IX, 0
25092 DD,39 ADD IX, SP IX AT TOP OF STACK
25094 C5 PUSH BC RESERVE A WORD
25095 F5 PUSH AF SAVE REGISTERS
25096 C5 PUSH BC
25097 D5 PUSH DE
25098 E5 PUSH HL
25099 DD,5E,02 LD D, (IX+2) DE= SERVICE CODE
25102 DD,56,03 LD E, (IX+3)
25105 AF XOR A CLEAR A
25106 CB,23 SL A
25108 CB,12 RL D CODEX2
25110 17 RL A JUMP FLAG
25111 21,0D,00 LD HL, 13 LAST EXT SVC
25114 CB,25 SLA L
25116 CB,14 RL H HLX2
25118 A7 AND A CLEAR FLAGS
25119 ED,52 SBC HL, DE
25121 20,15 JR NC, 21 (25144) EXT ROM
25123 21,18,00 LD HL, 24 (26)>= CODE =< 12)
25126 CB,25 SLA L HL*2
25128 CB,14 RL H
25130 A7 AND A CLEAR FLAGS
25131 ED,52 SBC HL, DE
25133 38,0F JR C, 15 (25154) CODE >= 34
25135 06,FF LD B, 255 RAM BASED SERVICES
25137 CD,05,64 CALL 25605 GET STATUS HOME BANK
25140 06,FF LD B, 255
25142 18,0A JR 10 (25154) SAVE
25144 06,FE LD B, 254
25146 0E,FE LD C, 254
25148 18,04 JR 4 (25154) SAVE
25150 06,FF LD B, 255
25152 0E,0 LD C, 0
25154 F5 SAVE PUSH AF SAVE JP FLAG & BANK EN-
25155 C5 PUSH BC ABLE PARAMETERS
25156 21,FF,1F LD HL, 8191 JUMP TABLE (WORKS)
25159 37 SCF DOWN FROM TOP)
25160 ED,52 SBC HL, DE
25162 06,FE LD B, 254
25164 CD,16,63 CALL 25366 GET WORD(READ TABLE)
25167 EB EX DE, HL
25168 C1 POP BC
25169 F1 POP AF GET JUMP FLAG
25170 AF AND A JUMP FLAG OFF?
25171 28,1F JR Z, 31 (25204) CALL
25173 DD,71,FE LD (IX+254), C BANK #
25176 DD,70,FF LD (IX+255), HORIZ SEL REG

```

25179 DD, 6E, 00		LD L, (IX+0) SAVE RET ADDR
25182 DD, 66, 01		LD H, (IX+1)
25185 DD, 74, 03		LD (IX+3), H
25188 DD, 75, 02		LD (IX+2), L
25191 DD, 72, 01		LD (IX+1), D SETUP STACK FOR
25194 DD, 72, 01		LD (IX+0), E GO TO BANK
25197 E1		POP HL GET REGISTERS
25198 D1		POP DE
25199 C1		POP BC
25200 F1		POP AF
25201 CD, 72, 65		CALL 25970 GO TO BANK
25204 DD, 6E, 00	CALL	LD L, (IX+0)
25207 DD, 66, 01		LD H, (IX+1)
25210 E5		PUSH HL RET ADDR
25211 DD, 6E, 04		LD L, (IX+4)
25214 DD, 66, 05		LD H, (IX+5)
25217 DD, 75, FE		LD (IX+254), L
25220 DD, 74, FF		LD (IX+255), H
25223 DD, 6E, 06		LD L, (IX+6)
25226 DD, 66, 07		LD H, (IX+7)
25229 DD, 75, 00		LD (IX+0), L
25232 DD, 74, 01		LD (IX+1), H
25235 DD, 71, 02		LD (IX+2), C BANK # HS
25238 DD, 70, 03		LD (IX+3), B
25241 DD, 73, 04		LD (IX+4), E ADDR
25244 DD, 72, 05		LD (IX+5), D
25247 E1		POP HL
25248 DD, 75, 06		LD (IX+6), L
25251 DD, 74, 07		LD (IX+7), H
25254 E1		POP HL
25255 D1		POP DE
25256 C1		POP BC
25257 F1		POP AF
25258 CD, D0, 65		CALL 26064 CALL BANK
25061 C9		RET

DISPATCHER INTERRUPTABLE RESTART SUBROUTINE

25262 F5	INTERUPT	PUSH AF (=RST 56)
25263 E5		PUSH HL
25264 DD, E5		PUSH IX
25266 21, 00, 00		LD HL, 0
25269 39		ADD HL, SP
25270 D5		PUSH DE
25271 3A, 15, 63		LD A, (25365) BS MAX BANK
25274 5F		LD E, A
25275 16, 00		LD D, 0
25277 13		INC DE
25178 13		INC DE
25279 A7		AND A CLEAR FLAGS
25280 ED, 52		SBC HL, DE
25282 EB		EX DE, HL
25283 DD, 21, 00, 00		LD IX, DE
25287 DD, 19		ADD IX, DE
25289 D1		POP DE
25290 DD, F9		LD SP, IX

25292 CD, 1E, 65		CALL 25886 SAVE STATUS
25295 C5		PUSH BC
25296 06, FF		LD B, 255
25298 CD, 05, 64		CALL 25605 GET STATUS
25301 06, FF		LD B, 255
25303 79		LD A, C
25304 E6, F8		AND 248 SAVE HIGH NIBBLE
25306 4F		LD C, A
25307 CD, 99, 64		CALL 25753 BANK ENABLE
25310 C1		POP BC
25311 2A, 78, 5C		LD HL, (23672) UPDATE FRAMES
25314 23		INC HL
25315 22, 78, 5C		LD (23672), HL
25318 7C		LD A, H
25319 B5		OR L HL=0?
25320 20, 03		JR NZ, 3 (25325) LIT 3
25322 FD, 34, 40		INC (IY+64) FRAMES LOW
25325 C5	LIT 3	PUSH BC
25326 D5		PUSH DE
25327 CD, E1, 02		CALL 737 UPDATE KEYBOARD
25330 D1		POP DE
25331 C1		POP BC
25332 DD, 21, 00, 00 POP HL&AF, DI		LD IX, 0
25336 DD, 39		ADD IX, SP
25338 CD, 4A, 65		CALL 25930 RESTORE STATUS
25341 DD, 23		INC IX
25343 DD, F9		LD SP, IX
25345 DD, E1		POP IX
25347 E1		POP HL
25348 F1		POP AF
25349 FB		EI
25350 C9		RET

DISPATCHER NONMASKABLE INTERRUPT ROUTINE

25351 F5	NONMASK INT	PUSH AF
25352 E5		PUSH HL
25353 2A, B0, 5C		LD HL, (23728) NMI ADD
25356 7C		LD A, H
25357 B5		OR L HL =0?
25358 20, 01		JR NZ, 1 (25361) LN13 (NO USR
25360 E9		JP (HL) SUPPLIED SER ROUTINE)
25361 E1	LN 13	POP HL
25362 F1		POP AF
25363 ED, 45		RET Z

BS MAX BANK REGISTER

25365 00	HOLDS MAX BANK AVAILABLE
----------	--------------------------

DISPATCHER GET WORD SUBROUTINE

25366 F5 GET WORD (READ JP TABLE)	PUSH AF ADDR=HL/BANK=B
25367 C5	PUSH BC RETURNS WORD IN HL
25368 D5	PUSH DE
25369 CD, 5E, 64	CALL 25694 GET BANK #(OF OWNER
25372 F5	PUSH AF ADDR)
25373 50	LD D, B

25374 47
 25375 CD, 05, 64
 25378 C5
 25379 CD, 4D, 64
 25382 2F
 25383 42
 25384 4F
 25385 CD, 99, 64
 25388 5E
 25389 23
 25390 56
 25391 2B
 25392 EB
 25393 C1
 25394 F1
 25395 47
 25396 CD, 99, 64
 25399 D1
 25400 C1
 25401 F1
 25402 C9

LD B, A
 CALL 25605 GET STATUS (OF OWNER)
 PUSH BC
 CALL 25677 GET CHUNK (ACTIVE LOW)
 CP L
 LD B, D
 LD C, A
 CALL 25753 BANK ENABLE
 LD E, (HL)
 INC HL
 LD D, (HL)
 DEC HL
 EX DE, HL
 POP BC
 POP AF
 LD B, A
 CALL 25753 BANK ENABLE (OWNER AD)
 POP DE
 POP BC
 POP AF
 RET

DISPATCHER PUT WORD SUBROUTINE

25403 F5 PUT WORD

25404 C5
 25405 CD, 5E, 64
 25408 F5(D5)
 25409 50
 25410 47
 25411 CD, 05, 64
 25414 C5
 25415 CD, 4D, 64
 25418 2F
 25419 42
 25420 4F
 25421 CD, 99, 64
 25424 73(C1) !!ERRORS!!
 25425 23(D1)
 25426 72(73)
 25427 2B(23)
 25428 C1(72)
 25429 F1(2B)
 25430 CD, 99, 64
 25433 C1
 25434 F1
 25435 C9

PUSH HL (DE=WORD/HL=ADDR/B=BANK)
 PUSH BC
 CALL 25694 GET BANK #(OWNER ADDR)
 PUSH AF !!ERROR!! (PUSH DE)
 LD D, B
 LD B, A
 CALL 25605 GET STATUS(OWNER)
 PUSH BC
 CALL 25677 GET CHUNK
 CP L
 LD B, D
 LD C, A
 CALL 25753 BANK ENABLE(OWNER ADD)
 LD (HL), E (POP BC)
 INC HL (POP DE)
 LD (HL), D (LD (HL), E)
 DEC HL (INC HL)
 POP BC (LD (HL), D)
 POP AF (DEC HL)
 CALL 25753 BANK ENABLE
 POP BC
 POP AF
 RET

DISPATCHER WRITE BANK STATUS REGISTER SUBROUTINE

25436 F5 WRITE BS REG PUSH AF (REG ADDR=D/REG DATA=E)
 25437 C5 PUSH BC
 25438 E5 PUSH HL
 25439 62 LD H, D
 25440 2E, 00 LD L, 0
 25442 3A, 00, C0 LD A, (49152) ARBITRARY ADDR
 25445 F5 PUSH AF WHICH IS SAVED AND RE-

25446 7E	LD A, (HL)	STORED.
25447 F5	PUSH AF	
25448 3E,07	LD A, 7	
25450 D3,F5	OUT (245), A	SOUND/STICK
25452 DB,F6	IN A, (246)	
25454 47	LD B, A	
25455 3E,0E	LD A, 14	
25457 D3,F5	OUT (245), A	SOUND
25459 DB,F6	IN A, (246)	
25461 4F	LD C, A	
25462 3E,07	LD A, 7	
25464 D3,F5	OUT (245), A	SOUND
25466 3E,40	LD A, 64	
25468 D3,F6	OUT (246), A	
25470 3E,0E	LD A, 14	
25472 D3,F5	OUT (245), A	
25474 AF	XOR A	
25475 D3,F6	OUT (246), A	
25477 3E,02	LD A, 2	
25479 32,00,0C	LD (49152), A	
25482 7B	ADD A, E	
25483 77	LD (HL), A	
25484 CB,2F	SRA A	
25486 CB,2F	SRA A	
25488 CB,2F	SRA A	
25490 CB,2F	SRA A	
25492 77	LD (HL), A	
25493 3E,07	LD A, 7	
25495 D3,F5	OUT (245), A	SOUND ADDR RESTORE
25497 78	LD A, B	
25498 D3,F6	OUT (246), A	
25500 3E,0E	LD A, 14	
25502 D3,F5	OUT (245), A	SOUND ADDR
25504 79	LD A, C	
25505 D3,F6	OUT (246), A	
25507 F1	POP AF	
25508 77	LD (HL), A	
25509 F1	POP AF	
25510 32,00,0C	LD (49152), A	
25513 E1	POP HL	
25514 C1	POP BC	
25515 F1	POP AF	
25516 C9	RET	

DISPATCHER READ BANK STATUS REGISTER SUBROUTINE

25517 F5	READ BS REG	PUSH AF (DE = ADDR/BYTE=L)
25518 C5		PUSH BC
25519 E5		PUSH HL
25520 62		LD H, D
25521 2E,00		LD L, 0 HL= MEM MAPPED ADDR
25523 3A,00,0C		LD A, (49152)
25526 F5		PUSH AF
25527 7E		LD A, (HL)
25528 F5		PUSH AF
25529 3E,07		LD A, 7

25531 D3,F5	OUT (245), A SOUND ADDR
25533 DB,F6	IN A, (246)
25535 47	LD B, A
25536 3E,0E	LD A, 14
25538 D3,F5	OUT (245), A
25540 DB,F6	IN A, (246)
25542 4F	LD C, A
25543 C5	PUSH BC
25544 3E,07	LD A, 7
25546 D3,F5	OUT (245), A
25548 3E,40	LD A, 64
25550 D3,F6	OUT (246), A
25552 3E,0E	LD A, 14
25554 D3,F5	OUT (245), A
25556 AF	XOR A CLEAR A
25557 D3,F6	OUT (246), A
25559 3E,02	LD A, 2
25561 32,00,CO	LD (49152), A
25564 7E	LD A, (HL)
25565 E6,0F	AND 15 SAVE LOW NIBBLE
25567 4F	LD C, A
25568 63	LD H, E
25569 7E	LD A, (HL)
25570 CB,27	SLA A
25572 CB,27	SLA A
25574 CB,27	SLA A
25576 CB,77	SLA A
25578 B1	OR C ADD C
25579 5F	LD E, A
25580 C1	POP BC
25581 3E,07	LD A, 7
25583 D3,F5	OUT (245), A
25585 78	LD A, B
25586 D3,F6	OUT (246), A
25588 3E,0E	LD A, 14
25590 D3,F5	OUT (245), A
25592 79	LD A, C
25593 D3,F6	OUT (246), A
25595 F1	POP AF
25596 77	LD (HL), A
25597 F1	POP AF
25598 32,00,CO	LD (49152), A
25601 E1	POP HL
25602 C1	POP BC
25603 F1	POP AF
25604 C9	RET

DISPATCHER GET BANK STATUS SUBROUTINE

25605 F5	GET STATUS	PUSH AF (BANK # =B)
25606 D5		PUSH DE
25607 78		LD A, B
25608 FE,FE		CP 254 EROM?
25610 28,2E(24)	!!ERROR!!	JR Z, 46 (36) ((25648) EXT)
25612 FE,FF		CP 255 HOME?
25614 28,1D(37)	!!ERROR!!	JR Z, 29(55) ((25671) HOME)

```

25616 A7
25617 28,1F(27) !!ERROR!!
25619 16,80
25621 58
25622 CD,5C,63
25625 16,40
25627 1E,80
25629 CD,AD,63
25632 7B
25633 2F
25634 4F
25635 16,A0
25637 1E,C1
25639 CD,AD,63
25642 43
25643 18,1D
25645 01,00,00
25648 18(OE),18(FF) !ERR!(EXT)
25650 DB,F4(FF) REWRITE TO
25652 2F(E6,80) END OF ROUT.
25653 47
25654 OE(28),00(12)
25656 18,10(08)
25658 DB(OE),FF (DOCK)
25660 E6(DB),80(FF)
25662 2F(E6,80)
25663 07
25664 47(20,08)
25665 DB,F4(DB,F4) (GET HS)
25667 2F
25668 E6(2F),01(18,02)
25670 B0
25671 47(DB,F4) (HOME)
25672 OE,00(4F) (EXIT 0)
25674 D1 (EXIT 1)
25675 F1
25676 C9

AND A A=0?
JR Z, 31(39) ((25658) DOCK)
LD D, 128
LD E, B ANOTHER BANK
CALL 25436 WRITE BS REG
LD D, 64
LD E, 128
CALL 25517 READ BS REG
LD A, E
CF L
LD C, A
LD D, 160
LD E, 192
CALL 25517 READ BS REG
LD B, E
JR 29 (25674) EXIT 1
LD BC, 0
JR 24 (LD C, 255)
IN A, (244) (IN A, (255))
CF L (AND 128)
LD B, A
LD C, 0 (JR Z, 18 (25674) EXIT 1)
JR 16 (JR 8 (25668) GET HS)
IN A, (255) (LD C, 255)
AND 128 (IN A, (255))
CPL (AND 128)
RLC A
LD B, A (JR NZ, 8 (25674) EXIT 1)
IN A, (244) (IN A, (254))
CPL
AND 1 (CF L) (JR 2 (25672) EXIT 0)
OR B
LD B, A (IN A, (244))
LD C, 0 (LD C, A)
POP DE
POP AF
RET

```

DISPATCHER GET CHUNK SUBROUTINE

```

25677 C5 GET CHUNK PUSH BC ADDR=HL/A=MASK
25678 7C LD A, H
25679 06,05 LD B, 5
25681 CB,3F SHIFT SRL A
25683 10,FC DJNZ 254 (25681) SHIFT (FIND 0
25685 3C INC A IN MASK)
25686 47 LD B, A
25687 AF XOR A CLEAR A
25688 37 SCF
25689 17 ROLL RL A
25690 10,FD DJNZ, 253 (25689) ROLL
25692 C1 POP BC
25693 C9 RET

```

DISPATCHER GET BANK NUMBER SUBROUTINE

```

25694 C5 GET BANK # PUSH BC ADDR=HL/A=BANK #

```

25695 D5		PUSH DE
25696 CD, 4D, 64		CALL 25677 GET CHUNK
25699 4F		LD C, A
25700 3A, 15, 63		LD A, (25365) BS MAX BANK
25703 A7		AND A A=0?
25704 28, 0A		JR Z, 10 (25714) G# RD DOCK
25706 47		LD B, A
25707 58	G# CHECK	LD E, B
25708 CD, 05, 64		CALL 25605 GET STATUS
25711 A1		AND C
25712 28, 23		JR Z, 35 (25749) G# EXP FOUND
25714 10, F7		DJNZ, 247 (25707) G# CHECK
25716 DB, F4	G# RD DOCK	IN A, (244) HORIZ SEL REG
25718 2F		CPL
25719 A1		AND C
25720 28, 18		JR Z, 24 (25746) G# DOCK
25722 0D		DEC C
25723 20, 11		JR NZ, 17 (25742) G# HOME LD
25725 DB, FF		IN A, (255)
25727 E6, 80		AND 128 SAVE HIGH BIT
25729 57		LD D, A
25730 DB, F4		IN A, (244) HORIZ SEL REG
25732 E6, 01		AND 1
25734 0F		RRC A
25735 A2		AND D
25736 28, 04		JR Z, 4 (25742) G# HOME LD
25738 3E, FE		LD A, 254
25740 18, 08		JR 8 (25750) G# EXIT
25742 3E, FF	G# HOME LD	LD A, 255
25744 18, 04		JR 4 (25750) G# EXIT
25746 AF	G# DOCK	XOR A CLEAR A
25747 18, 01		JR 1 (25750) G# EXIT
25749 78	G# EXP FOUND	LD A, B RETURN EXP BANK #
25750 D1	G# EXIT	POP DE
25751 C1		POP BC
25752 C9		RET

DISPATCHER BANK ENABLE SUBROUTINE

25753 F5(00) !!ERROR!!	BANK ENABLE PUSH AF (NOP)	B=BANK #
25754 C5	PUSH BC	C= HORIZ SEL R
25755 D5	PUSH DE	
25756 E5	PUSH HL	
25757 60(F3) !!ERROR!!	LD H, B (DI)	
25758 3A, 15, 63	LD A, (25365) BS MAX BANK	
25761 A7	AND A CLEAR FLAGS	
25762 28, 11	JR Z, 17 (25781) SKIP	
25764 16, 80	LD D, 128	
25766 1E, 00	LD E, 0	
25768 CD, 5C, 63	CALL 25436 WRITE BS REG	
25771 16, A0	LD D, 160	
25773 F5	PUSH AF	
25774 79	LD A, C	
25775 2F	CP L	
25776 5F	LD E, A	
25777 F1	POP AF	

25778 CD,5C,63		CALL 25436 WRITE BS REG
25781 78	SKIP	LD A, B
25782 A7		AND A A= 0?
25783 20,11		JR NZ, 17 (25802) NEXT DOCK
25785 79		LD A, C
25786 FE,FF		CP 255
25788 28,06		JR Z, 6 (25794) EXT OK
25790 DB,FF		IN A, (255)
25792 CB,BF		RES 7, A
25794 D3,FF		OUT (255), A
25796 79	EXT OK	LD A, C
25797 2F		CPL
25798 D3,F4		OUT (244), A ENABLE DOCK
25800 18,F4		JR 79 (25881) EXIT
25802 78	NEXT DOCK	LD A, B CK IF EXTENSION
25803 FE,FE		IN A, (255)
25805 20,1D		RL A
25807 DB,FF		RR C
25809 17		CCF
25810 CB,19		RR C
25812 3F		CCF
25813 1F		RR A
25814 D3,FF		OUT (255), A
25816 CB,7F		BIT 7, A
25818 20,08		JR NZ, 8 (25828) SET
25820 DB,F4		IN A, (244)
25822 CB,87		RES 0, A
25824 D3,F4		OUT (244), A
25826 18,35		JR 53 (25881) EXIT
25828 DB,F4	SET	IN A, (244) HORIZ SEL REG
25830 CB,C7		SET 0, A
25832 D3,F4		OUT (244), A DISABLE DOCK
25834 18,2D		JR 45 (25881) EXIT
25836 DB,F4	NEXT EXT	IN A, (244) HORIZ SEL REG
25838 2F		CPL
25839 5F		LD E, A
25840 79		LD A, C
25841 2F		CPL
25842 B3		OR E
25843 2F		CPL
25844 D3,F4		OUT (244), A
25846 CB,41		BIT 0, C
25848 20,0C		JR NZ, 12 (25862) CHK HOME
25850 DB,FF		IN A, (255) DISABLE EXTEND
25852 CB,BC		RES 7, A
25854 DB,FF		OUT (255), A
25856 DB,F4		IN A, (244)
25858 CB,87		RES 0, A
25860 D3,F4		OUT (254), A
25862 78	CHK HOME	LD A, B
25863 FE,FF		CP 255
25865 28,0E		JR Z, 14 (25881) EXIT (HOME)
25867 16,80		LD D, 128
25869 58		LD E, B
25870 CD,5C,63		CALL 25436 WRITE BS REG (NEW)

```

25873 16,40          LD D, 64
25875 79             LD A, C
25876 2F             CPL
25877 5F             LD E, A
25878 CD,5C,63       CALL 25436 WRITE BS REG
25881 E1             EXIT POP HL
25882 D1             POP DE
25883 C1             POP BC
25884 F1(FB) !!ERROR!! POP AF (EI)
25885 C9             RET

```

DISPATCHER SAVE BANK STATUS SUBROUTINE

```

25886 F5  SAVE BANK STATUS  PUSH AF
25887 C5                PUSH BC
25888 D5                PUSH DE
25889 DB,FF            IN A, (255)
25891 00,00            NOP
25893 DD,77,00         LD (IX+0), A
25896 DD,23            INC IX
25898 DB,F4            IN A, (244) HORIZ SEL REG
25900 DD,77,00         LD (IX+0), A
25903 DD,23            INC IX
25905 3A,15,63        LD A, (25365) BS MAX BANK
25908 A7                AND A A=0?
25909 28,0D            JR Z, 13 (25924) SS EXIT
25911 47                LD B, A
25912 58                SS LOOP LD E, B
25913 CD,05,64         CALL 25605 GET STATUS
25916 DD,71,00         LD (IX+0), C
25919 DD,23            INC IX
25921 43                LD B, E
25922 10,F4            DJNZ, 244 (25922) SS LOOP
25924 DD,2B            SS EXIT DEC IX
25926 D1                POP DE
25927 C1                POP BC
25928 F1                POP AF
25929 C9                RET

```

DISPATCHER RESTORE STATUS SUBROUTINE

```

25930 F5(F3)!!ERROR!! RESTORE STATUS PUSH AF (DI)
25931 C5                PUSH BC
25932 D5                PUSH DE
25933 DD,7E,00         LD A, (IX+0)
25936 D3,FF            OUT (255), A
25938 DD,23            INC IX
25940 DD,7,00          LD A, (IX+0)
25943 D3,F4            OUT (244), A
25945 DD,23            INC IX
25947 3A,15,63        LD A, (25363) BS MAX BANK
25950 A7                AND A A=0?
25951 28,0B            JR Z, 11 (25964) RS EXIT
25953 47                LD B, A
25954 DD,4E,00         RS LOOP LD C, (IX+0)
25957 CD,99,64         CALL 25753 BANK ENABLE
25960 DD,23            INC IX

```


25962 10,F6		DJNZ, 246 (25954) RS LOOP
25964 DD,2B	RS EXIT	DEC IX
25966 D1		POP DE
25967 C1		POP BC
25968 F1(FB) !!ERROR!!		POP AF (EI)
25969 C9		RET

DISPATCHER GOTO BANK ROUTINE

25970 DD,21,00,00	GOTO BANK	LD IX, 0	BANK/HORIZ SEL REG ON
25974 DD,39		ADD IX, SP	STACK
25976 DD,71,00		LD (IX+2), C	
25979 DD,70,01		LD (IX+1), B	
25982 DD,4E,02		LD C, (IX+2)	
25985 DD,46,03		LD B, (IX+3)	
25988 CD,99,64		CALL 25753 BANK ENABLE	
25991 C1		POP BC	
25992 DD,E1		POP IX DISCARD	
25994 DD,E1		POP IX	
25996 DD,E9	JF(IX)	JF (IX)	

THE BANK SWITCH STACK (WORKS FROM THE BOTTOM UP)

25997-26060 FF OR 00		GENERALLY EMPTY OR DATA FROM LAST
26062 CE,65	BS SP	(26062) USE

CALL BANK SUBROUTINE

26064 E3	CALL BANK	EX (SP), HL	PUSHED ON STACK
26065 DD,2A,CE,65		LD IX, (26062) BANK #/HORIZ SEL R	
26069 DD,2B		DEC IX	PRM OUT/PRM IN
26071 DD,74,00		LD (IX+0), H	
26074 DD,2B		DEX IX	
26076 DD,75,00		LD (IX+0), L	PUSH HL IN BS STACK
26079 E1		POP HL	
26080 E3		EX (SP), HL	GET PRM IN
26081 DD,2B		DEC IX	
26083 DD,74,00		LD (IX+0), H	PRM IN TO BS STACK
26086 DD,2B		DEC IX	
26088 DD,75,00		LD (IX+0), L	
26091 DD,22,CE,65		LD (26062), IX	UPDATE BS SP
26095 D5		PUSH DE	SAVE REGISTERS
26096 C5		PUSH BC	
26097 F5		PUSH AF	
26098 21,00,00		LD HL, 0	
26101 39		ADD HL, SP	
26102 54		LD D, H	SP TO DE
26103 5D		LD E, L	
26104 3A,15,63		LD A, (25365) BS MAX BANK	
26107 4F		LD C, A	
26108 06,00		LD B, 0	MAX BANK # TO BC
26110 03		INC BC	
26111 03		INC BC	MAX BANK # + 2
26112 A7		AND A	CLEAR FLAGS
26113 ED,52		SBC HL, BC	IF MAX BANK=0, HL=SP
26115 F9		LD SP, HL	ELSE 1 ADDR LESS/#
26116 DD,21,00,00		LD IX, 0	
26120 DD,19		ADD IX, DE	(DE=SP)

26122 EB		EX DE, HL
26123 DD, 4E, 08		LD C, (IX+8) PRM OUT
26126 DD, 46, 08 (09) ERROR!!		LD B, (IX+8(9)) PRM OUT
26129 3E, 0E		LD A, 14 14 SPACES + BANKSX2
26131 81		ADD A, C
26132 4F		LD C, A
26133 30, 01		JR NC, 1 (26136) NO CARRY
26135 04		INC B
26136 ED, 80	NO CARRY	LDIR MAKE ROOM FOR BANK STATUS
26138 D5		PUSH DE
26139 DD, E1		POP IX IX=DE
26141 CD, 1E, 65		CALL 25886 SAVE STATUS
26144 DD, 21, 00, 00		LD IX, 0
26148 DD, 39		ADD IX, SP
26150 DD, 4E, 0A		LD C, (IX+10) HORIZ SEL REG
26153 DD, 46, 0B		LD B, (IX+11) BANK
26156 CD, 99, 64		CALL 25753 BANK ENABLE
26159 F1		POP AF
26160 C1		POP BC
26161 D1		POP DE
26162 E1		POP HL
26163 DD, E1		POP IX DISCARD (GENERALLY 0)
26165 DD, E1		POP IX DISCARD
26167 DD, E1		POP IX
26169 CD, 8C, 65		CALL 25996 JF (IX)
26172 F5		PUSH AF
26173 C5		PUSH BC
26174 D5		PUSH DE
26175 E5		PUSH HL
26176 DD, 2A, CE, 65		LD IX, (26062) BS SP
26180 DD, 4E, 00		LD C, (IX+0) DESTINATION ADDR
26183 DD, 23		INC IX
26185 DD, 46, 00		LD B, (IX+0)
26188 DD, 23		INC IX
26190 DD, 22, CE, 65		LD (26062), IX BS SP
26194 DD, 21, 00, 00		LD IX, 0
26198 DD, 39		ADD IX, SP
26200 3E, 08		LD A, 8
26202 81		ADD A, C
26203 4F		LD C, A
26204 30, 01		JR NC, 1 (26207) NO CARRY-2
26206 04		INC B
26207 DD, 09	NO CARRY-2	ADD IX, BC
26209 DD, E5		PUSH IX
26211 E1		POP HL HL=IX
26212 2B		DEC HL
26213 CD, 4A, 65		CALL 25930 RESTORE STATUS
26216 DD, E5		PUSH IX
26218 D1		POP DE DE=IX
26219 ED, 88		LDDR
26221 EB		EX DE, HL
26222 23		INC HL
26223 F9		LD SP, HL RESTORE SP
26224 DD, 2A, CE, 65		LD IX, (26062) BS SP
26228 DD, 4E, 00		LD C, (IX+0)

26231 DD, 23
 26233 DD, 46, 00
 26236 DD, 23
 26238 DD, 22, CE, 65
 26242 C5
 26243 DD, E1
 26245 E1
 26246 D1
 26247 C1
 26248 F1
 26249 DD, E5
 26251 C9

INC IX
 LD B, (IX+0)
 INC IX
 LD (26062), IX UPDATE BS SP
 PUSH BC
 POP IX IX=BC
 POP HL
 POP DE
 POP BC
 POP AF
 PUSH IX
 RET TO IX ADDR

DISPATCHER MOVE BYTES ROUTINE

26252 E5 MOVE BYTES

26253 D5
 26254 C5
 26255 48
 26256 DD, 46, 09
 26259 CD, 99, 64
 26262 42
 26263 4B
 26264 DD, 5E, 00
 26267 DD, 56, 01
 26270 DD, 6E, 06
 26273 DD, 66, 07
 26276 07
 26277 0F
 26278 38, 05
 26280 ED, B0
 26282 09
 26283 18, 05
 26285 ED, B8
 26287 A7
 26288 ED, 42
 26290 DD, 75, 06
 26293 DD, 74, 07
 26296 C1
 26297 E1
 26298 E5
 26299 C5
 26300 DD, 46, 08
 26303 CD, 99, 64
 26306 44
 26307 4D
 26308 DD, 5E, 04
 26311 DD, 56, 05
 26314 DD, 6E, 00
 26317 DD, 66, 07
 26320 07
 26321 0F
 26322 38, 05
 26324 ED, B0
 26326 09
 26327 18, 05

REVERSE 1

UP 1

PUSH HL DE=# OF BYTES, A=UP/DOWN
 PUSH DE
 PUSH BC
 LD C, B
 LD B, (IX+9)
 CALL 25753 BANK ENABLE
 LD B, D
 LD C, E
 LD E, (IX+0)
 LD D, (IX+1)
 LD L, (IX+6)
 LD H, (IX+7)
 RLC A CHECK BIT 7
 RRC A
 JR C, 5 (26285) REVERSE 1
 LDIR
 ADD HL, BC INC POINTER
 JR 5 (26290) UP 1
 LDDR
 AND A CLEAR FLAGS
 SBC HL, BC
 LD (IX+6), L DEST ADDR
 LD (IX+7), H
 POP BC UPDATE HL & BC
 POP HL
 PUSH HL
 PUSH BC
 LD B, (IX+8)
 CALL 25753 BANK ENABLE
 LD B, H
 LD C, L
 LD E, (IX+4) DEST ADDR
 LD D, (IX+5)
 LD L, (IX+0) BUFF POINTER
 LD H, (IX+1)
 RLC A TEST BIT 7 (ON=DOWN)
 RRC A
 JR C, 5 (26329) REVERSE 2
 LDIR
 ADD HL, BC
 JR 5 (26334) UP 2

```

26329 ED,B8      REVERSE 2  LDDR
26331 A7          AND A  CLEAR FLAGS
26332 ED,42       SBC HL, DE
26334 DD,75,04    UP 2      LD (IX+4), L DEST ADDR
26337 DD,74,05    LD (IX+5), H
26340 C1          POP BC
26341 D1          POP DE
26342 E1          POP HL
26343 C9          RET

```

DISPATCHER CREAT BITMAP SUBROUTINE

```

26344 54          CREAT BITMAP LD D, H      HL=ADDR, A=BITMAP
26345 5D          LD E, L
26346 DD,4E,02    LD C, (IX+2) LENGTH
26349 DD,46,03    LD B, (IX+3)
26352 DD,76,00    LD A, (IX+0) DIRECTION
26355 07          RLC A      TEST BIT 7(DIRECTION)
26356 0F          RRC A
26357 38,03       JR C, (26362) SUB
26359 09          ADD HL, DE
26360 18,02       JR 2 (26364) CONTINUE
26362 ED,42       SUB        SBC HL, DE
26364 CD,4D,64    CONTINUE  CALL 25677 GET CHUNK(END CHUNK)
26367 2F          CPL
26368 4F          LD B, A
26369 EB          EX DE, HL
26370 CD,4D,64    CALL 25677 GET CHUNK(START CHUNK)
26373 2F          CP L
26374 4F          LD C, A
26375 A8          XOR B      BC=0?
26376 28,16       JR Z, 22 (26400) EXIT
26378 79          LD A, C
26379 A0          AND B
26380 47          LD B, A
26381 0E,00       LD C, 0
26383 37          SCF
26384 78          NB 1      LD A, B
26385 CB,11       RL C
26387 A1          AND C
26388 20,FA       JR NZ, 250 (26384) NB 1
26390 78          NB 2      LD A, B
26391 CB,11       RL C
26393 A1          AND C
26394 28,04       JR Z, 4 (26400) EXIT
26396 A8          XOR B
26397 47          LD B, A
26398 18,F6       JR 246 (26390) NB 2
26400 78          EXIT      LD A, B
26401 C9          RET

```

DISPATCHER XFER BYTES ROUTINE

```

26402 F5          XFER BYTES  PUSH AF ON STACK:DIRECTION, LEN,
26403 C5          PUSH BC      DEST ADDR, SOURCE ADDR,
26404 D5          PUSH DE      DEST BANK, SOURCE BANK,
26405 E5          PUSH HL      STATUS= A

```

26406 21,00,00		LD HL, 0
26409 39		ADD HL, SP
26410 11,0A,00		LD DE, 10- NEED 10 BYTES
26413 19		ADD HL, DE MOVE HL TO 1ST DATA
26414 EB		EX DE, HL BYTE
26415 3A,15,63		LD A, (25365) BS MAX BANK
26418 4F		LD C, A
26419 06,00		LD B, 0
26421 21,00,00		LD HL, 0
26424 39		ADD HL, SP
26425 A7		AND A CLEAR FLAGS
26426 ED,42		SBC HL, BC
26428 2B		DEC HL
26429 2B		DEC HL
26430 E5		PUSH HL
26431 DD,E1		POP IX IX=HL
26433 DD,F9		LD SP, IX
26435 CD,1E,65		CALL 25886 SAVE STATUS
26438 D5		PUSH DE
26439 DD,E1		POP IX IX =DE
26441 DD,6E,06		LD L, (IX+6)
26444 DD,66,07		LD H, (IX+7)
26447 CD,E8,66		CALL 26344 CREAT BITMAP
26450 F5		PUSH AF
26451 DD,6E,04		LD L, (IX+4)
26454 DD,66,05		LD H, (IX+5)
26457 CD,E8,66		CALL 26344 CREAT BITMAP
26460 4F		LD C, A
26461 F1		POP AF
26462 47		LD B, A
26463 DD,7E,09		LD E, (IX+9)
26466 DD,56,08		LD D, (IX+8)
26469 BA		CP D
26470 20,05		JR NZ, 5 (26477) DIFFERENT BANK
26472 78		LD A, B
26473 A1		AND C
26474 47(5F)		LD B, A (LD E, A)
26475 18,0B		JR 11 (26488) DO MOVE
26477 78	DIFFERENT BANK	LD A, B
26478 B1		OR C BC= 0?
26479 FE,FF		CP 255
26481 20,2D		JR NZ, 45 (26528) OVERLAP
26483 58		LD E, B
26484 42		LD B, D
26485 CD,99,64		CALL 25753 BANK ENABLE
26488 DD,46,09	DO MOVE	LD B, (IX+9)
26491 4B		LD C, E
26492 CD,99,64		CALL 25753 BANK ENABLE
26495 DD,6E,06		LD L, (IX+6) SOURCE ADDR
26498 DD,66,07		LD H, (IX+7)
26501 DD,5E,04		LD E, (IX+4) DESTINATION ADDR
26504 DD,56,05		LD D, (IX+5)
26507 DD,4E,02		LD C, (IX+2) LENGTH
26510 DD,46,03		LD B, (IX+3)
26513 DD,7E,00		LD A, (IX+0) DIRECTION

26516 07		RLC A TEST BIT 7
26517 0F		RRC A
26518 38,04		JR C, 4 (26524) REVERSE
26520 ED,B0		LDIR
26522 18,52		JR 82 (26606) EXIT
26524 ED,B8	REVERSE	LDDR
26526 18,4E		JR 78 (26606) EXIT
26528 21,C0,5C	OVERLAP	LD HL, 23744 MACH STK BOTTOM
26531 C5		PUSH BC
26532 06,FF		LD B, 255
26534 CD,16,63		CALL 25366 GET WORD
26537 C1		POP BC
26538 11,00,02		LD DE, 512 SKT SIZE
26541 A7		AND A CLEAR FLAGS
26542 ED,52		SBC HL, DE HL=ADDR OF STK LIMIT
26544 11,20,00		LD DE, 32 FREE BYTES
26547 19		ADD HL, DE DE =NEW SP
26548 EB		EX DE, HL
26549 21,00,00		LD HL, 0
26552 39		ADD HL, SP HL =OLD SP
26553 13		INC DE
26554 A7		AND A CLEAR FLAGS
26555 ED,52		SBC HL, DE
26557 30,04		JR NC, 4 (26563) SPACE
26559 3E,01		LD A, 1 RET ERR
26561 18,2B		JR 43 (26606) EXIT
26563 1B	SPACE	DEC DE
26564 EB		EX DE, HL
26565 F9		LD SP, HL
26566 13		INC DE
26567 DD,7E,00		LD A, (IX+0) DIRECTION
26570 DD,75,00		LD (IX+0), L BUFFER POINTER
26573 DD,74,01		LD (IX+1), H
26576 DD,6E,02		LD L, (IX+2) LENGTH
26579 DD,66,03		LD H, (IX+3)
26582 A7	MOVE LOOP	AND A CLEAR FLAGS
26583 ED,52		SBC HL, DE
26585 38,05		JR C, 5 (26592) LAST MOVE
26587 CD,8C,66		CALL 26252 MOVE BYTES
26590 18,F6		JR 246 (26582) MOVE LOOP
26592 19	LAST MOVE	ADD HL, DE
26593 EB		EX DE, HL
26594 CD,8C,66		CALL 26252 MOVE BYTES
26597 EB		EX DE, HL
26598 DD,6E,00		LD L, (IX+0) BUFFER POINTER
26601 DD,66,01		LD H, (IX+1)
26604 19		ADD HL, DE
26605 F9		LD SP, HL
26606 AF	EXIT	XOR A CLEAR A
26607 DD,21,00,00		LD IX, 0
26611 DD,39		ADD IX, SP
26613 CD,4A,65		CALL 25930 RESTORE STATUS
26616 DD,23		INC IX
26618 DD,F9		LD SP, IX
26620 E1		POP HL

26621 D1
 26622 C1
 26623 F1
 26624 DD,E1
 26626 DD,E3
 26628 DD,E1
 26630 DD,E3
 26632 DD,E1
 26634 DD,E3
 26636 DD,E1
 26638 DD,E3
 26640 DD,E1
 26642 DD,E3
 26644 C9

26645 DD,E1

DISPATCH SOURCE STATEMENT

26647 F5
 26648 DB,FF
 26650 CB,FF
 26652 D3,FF
 26654 3E,01
 26656 D3,F4
 26658 F1
 26659 E9

26660-26687

CHANNEL TABLE

26688-26709

26710 NORMAL START OF BASIC PROGRAM

POP DE
 POP BC
 POP AF
 POP IX
 EX (SP), IX
 POP IX
 EX (SP), IX
 POP IX
 EX (SP), IX
 POP IX
 EX (SP), IX
 POP IX
 EX (SP), IX
 RET

POP IX THRASH RET ADDR

PUSH AF
 IN A, (255)
 SET 7, A
 OUT (255), A
 LD A, 1
 OUT (244), A
 POP AF
 JP (HL)

NOT USED

SEE ADDR 4522 FF FOR INITIAL SETUP

DISASSEMBLY OF EXTENDED ROM

192

RESTART ROUTINES

```

0000 F3      RST 0 START UP      DI
0001 18,46   JR 70 (73) START UP CONTINUED
0003-0007 FF (UNUSED)

```

ERROR RESTART

```

0008 2A,5D,5C      RST 8 ERROR  LD HL, (23645) CHAR ADDR
0011 22,5F,5C      LD (23647), HL X POINTER
0014 E1            POP HL
0015 6E            LD L, (HL)
0016 FD,75,00      LD (1Y+0), L ERR #
0019 ED,7B,3D,5C   LD SP, (23613) ERR SP
0023 21,54,13      LD HL, 4948 RESET
0026 E5            PUSH HL
0027 26,FF      GOTO HOME BANK  LD H, 255
0029 2E,00      LD L, 0
0031 E5            PUSH HL
0032 F5            PUSH AF
0033 3A,C2,5C      LD A, (23746) VID MODE
0036 A7            AND A A=0?
0037 00            NOP
0038 28,04        JR Z, 4 (0044) MODE 0
0040 F1            POP AF
0041 CD,72,65      CALL 64818 HIGH GOTO BANK
0044 F1            POP AF
0045 CD,72,65      CALL 25970 GOTO BANK
0048-0055 FF      UNUSED

```

INTERRUPT RESTART

```

0056 F5      RST 56      PUSH AF
0057 F3      DI
0058 3A,C2,5C      LD A, (23746) VID MODE
0061 A7      AND A A=0?
0062 00      NOP
0063 28,04    JR Z, 4 (0059) MODE 0
0065 F1      POP AF
0066 C3,6E,FA  JP 64110 INTERRUPT HIGH
0069 F1      POP AF
0070 C3,AE,62  JP 25262 INTERRUPT LOW

```

STARTUP ROUTINE CONTINUED

```

0073 3E,01      LD A, 1
0075 D3,F4      OUT (244), A HORIZ SEL REG
0077 18,0B      JR 11 (0090) XFER
0079 AF      SET HORIZ SEL REG  XOR A CLEAR A & CARRY
0080 D3,F4      OUT (244), A
0082 D3,FF      OUT (255), A
0084 11,FF,FF   LD DE, 255/255 BANK #/
0087 C3,4F,00   JP 3377 HOME INITIALIZATION
0090 21,4F,00   LD HL, 79 XFER 79-87 TO 24576FF
0093 11,00,60   LD DE, 24576
0096 01,0B,00   LD BC, 11
0099 ED,B0      LDIR
0101 C3,00,60   JP 24576

```

CASSETTE HANDLING ROUTINES

SAVE BYTES SUBROUTINE

0104 21,E5,00	WRITE TAPE	LD HL, 229 WRITE BORDER (S/L RET)
0107 E5		PUSH HL
0108 21,80,1F		LD HL, 8064 5 SEC HEADER LEADER
0111 CB,7E		BIT 7, A
0113 28,03		JR Z, 3 (0115) SAVE FLAG
0115 21,98,0C		LD HL, 3224 2 SEC LEADER FOR PRO-
0118 08	SAVE FLAG	EX AF, AF' GRAM/DATA BLOCK
0119 13		INC DE
0120 DD,2B		DEC IX
0122 F3		DI
0123 3E,02		LD A, 2 SIGNAL MIC ON
0125 47		LD B, A
0126 10,FE	SAVE LEADER WAIT	DJNZ, 254 (0126)
0128 DE,FE		OUT (254), A MIC OFF/BORDER CYAN
0130 EE,0F		XOR 15 SAVE LOW NIBBLE
0132 06,A4		LD B, 164
0134 2D		DEC L
0135 20,F5		JR NZ, 245 (0126) SAVE LEADER
0137 05		DEC B
0138 25		DEC H
0139 F2,7E,00		JR P, 126 SAVE LEADER
0142 06,2F		LD B, 47 SYNC PUSLE
0144 10,FE	SYNC-1	DJNZ, 254 (0144) SYNC-1
0146 3D,FE		OUT (254), A MIC ON-RED
0148 3E,0D		LD A, 13 MIC OFF-CYAN
0150 06,37		LD B, 55 MIC ON(TIME)
0152 10,FE	SYNC-2	DJNZ, 254 (0152) SYNC-2
0154 D3,FE		OUT (254), A MIC OFF-CYAN
0156 01,0E,3B		LD BC, B=TIME C=MIC OFF-YELLOW
0159 08		EX AF, AF'
0160 6F		LD A, L
0161 C3,AD,00		JP 173 SAVE START
0164 7A	SAVE LOOP	LD A, D
0165 B3		OR E DE=0?
0166 28,0C		JR Z, 12 (0180) SAVE PARITY
0168 DD,6E,00		LD L, (IX+0) NEXT BYTE
0171 7C	SAVE LOOP P	LD A, H CURRENT PARITY
0172 AD		XOR L
0173 67	SAVE START	LD H, A RESTORE PARITY
0174 3E,01		LD A, 1 MIC ON-BLUE
0176 37		SCF MARKER FOR 8 BITS OF BYTE
0177 C3,CB,00		JP 203 SAVE 8 BITS
0180 6C	SAVE FARITY	LD L, H
0181 18,F4		JR 244 (0168) SAVE LOOP P
0183 79	SAVE BIT 2	LD A, C
0184 CB,78		BIT 7, B
0186 10,FE	SAVE BIT	DJNZ, 254 (0186) SAVE BIT
0188 30,04		JR NC, 4 (0194) SAVE OUT
0190 06,42		LD B, 66
0192 10,FE	SAVE SET	DJNZ, 254 (0192) SAVE SET
0194 D3,FE	SAVE OUT	OUT (254), A
0196 06,3E		LD B, 62 TIMING CONSTANT 2ND PASS

```

0198 20,EF
0200 25
0201 AF
0202 3C
0203 CB,15      SAVE 8 BITS
0205 C2,BA,00
0208 1E
0209 DD,23
0211 06,31
0213 3E,7F
0215 DB,FE
0217 1F
0218 D0
0219 7A
0220 3C
0221 C2,A4,00
0224 06,3B
0226 10,FE      SAVE DELAY
0228 C9

```

SAVE/LOAD RETURN ROUTINE

```

0229 F5      WRITE BORDER
0230 3A,48,5C
0233 E6,38
0235 0F
0236 0F
0237 0F
0238 D3,FE
0240 3E,7F
0242 DB,FE
0244 1F
0245 FB
0246 38,02
0248 CF      ERR D
0249 0C
0250 F1      RETURN
0251 C9

```

LOAD BYTES SUBROUTINE

```

0252 14      READ TAPE
0253 08
0254 15
0255 F3
0256 3E,0F
0258 D3,FE
0260 21,E5,00
0263 E5
0264 DB,FE
0266 1F
0267 E6,20
0269 F6,02
0271 4F
0272 BF
0273 C0      LOAD BREAK
0274 CD,8D,01  LOAD START

```

```

JR NZ, 239 (0183) SAVE BIT 2
DEC B
XOR A CLEAR A
INC A  A=1
RL L
JP NZ, 186 (0183) SAVE BIT 2
DEC DE  BYTE COUNTER
INC IX ADVANCE BASE ADDR
LD B, 49
LD A, 127  BREAK
IN A, (254) BREAK?
RR A
RET NC
LD A, D
INC A
JP NZ, 164 SAVE LOOP
LD B, 59
DJNZ, 254 (0226) SAVE DELAY
RET

```

```

PUSH AF
LD A, (23624) BORDER COLOR
AND 56 SAVE COLOR ONLY
RRC A  DIVIDE BY 8
RRC A
RRC A
OUT (254), A  SEND COLOR
LD A, 127
IN A, (254)
RR A
EI
JR C, 2 (0250) RETURN
RST 8 ERROR
D BREAK--CONT repeats
POP AF
RET

```

```

INC D
EX AF, AF'  A=0 FOR HEADER
DEC D      A=FF FOR DATA
DI      CARRY OFF = VERIFY
LD A, 15
OUT (254), A
LD HL, 229 WRITE BORDER
PUSH HL  RETURN ADDR
IN A, (254)
RR A
AND 32 SAVE 5TH BIT
OR 2  SET BIT 1 (RED)
LD C, A 2=ON, 34=OFF
CP A (SET ZERO FLAG)
RET NZ (IF BREAK)
CALL 397 READ EDGE

```

0277 30,FA		JR NC, 250 (0273) LOAD BREAK
0279 21,15,04		LD HL, 1045
0282 10,FE	LOAD WAIT	DJNZ, 254 (0282) LOAD WAIT
0284 2B		DEC HL
0285 7C		LD A, H
0286 B5		OR L HL=0?
0287 20,F9		JR NZ, 249 (0282) LOAD WAIT
0289 CD,89,01		CALL 393 READ BIT
0292 30,EB		JR NC, 235 (0273) LOAD BREAK
0294 06,9C	LOAD LEADER	LD B, 156 TIMING
0296 CD,89,01		CALL 393 READ BIT
0299 30,E4		JR NC, 228 (0273) LOAD BREAK
0301 36,C6		LD A, 198
0303 B8		CP B RIGHT SPACING?
0304 30,E0		JR NC, 224 (0274) LOAD START
0306 24		INC H
0307 20,F1		JR NZ, 241 (0294) LOAD LEADER
0309 06,C9	SYNC	LD B, 201
0311 CD,8D,01		CALL 397 READ EDGE
0314 30,D5		JR NC, 244 (0273) LOAD BREAK
0316 78		LD A, B
0317 FE,D4		CP 212 SPACING?
0319 30,F4		JR NC, 244 (0319) SYNC
0321 CD,8D,01		CALL 397 READ EDGE
0324 D0		RET NC
0325 79		LD A, C
0326 EE,03		XOR 3
0328 4F		LD C, A
0329 26,00		LD H, 0
0331 06,B0		LD B, 176 FLAG BYTE
0333 18,1F		JR 31 (0366) LOAD MARKER
0335 08	LOAD LOOP	EX AF, AF'
0336 20,07		JR NZ, 7 (0345) LOAD FLAG
0338 30,0F		JR NC, 15 (0355) LOAD VERIFY
0340 DD,75,00		LD (IX+0), L
0343 18,0F		JR 15 (0360) LOAD NEXT
0345 CB,11	LOAD FLAG	RL C
0347 AD		XOR L
0348 C0		RET NZ
0349 79		LD A, C
0350 1F		RR A
0351 4F		LD C, A
0352 13		INC DE
0353 18,07		JR 7 (0363) LOAD DEC
0355 DD,7E,00	LOAD VERIFY	LD A, (IX+0)
0358 AD		XOR L
0359 C0		RET NZ
0360 DD,23	LOAD NEXT	INC IX
0362 1B	LOAD DEC	DEC DE
0363 08		EX AF, AF'
0364 06,B2		LD B, 178 TIMING
0366 2E,01	LOAD MARKER	LD L, 1
0368 CD,89,01	LOAD 8 BITS	CALL 393 READ BIT
0371 D0		RET NC
0372 3E,CB		LD A, 203 SPACING

0374 B8	CP B
0375 CB, 15	RL L
0377 06, B0	LD B, 176
0379 D2, 70, 01	JP NC, 368 LOAD 8 BITS
0382 7C	LD A, H PARITY MATCHING
0383 AD	XOR L ADD NEW BYTE
0384 67	LD H, A RESAVE
0385 7A	LD A, D
0386 B3	OR E DE =0?
0387 20, CA	JR NZ, 202 (0335) LOAD LOOP
0389 7C	LD A, H
0390 FE, 01	CP 1
0392 C9	RET

READ BIT AND READ EDGE SUBROUTINES

0393 CD, 8D, 01	READ BIT	CALL 397 READ EDGE
0396 D0		RET NC
0397 3E, 16	READ EDGE	LD A, 22
0399 3D	LOAD DELAY	DEC A
0400 20, FD		JR NZ, 253 (0399) LOAD DELAY
0402 A7		AND A CLEAR FLAGS
0403 04	LOAD SAMPLE	INC B
0404 C8		RET Z
0405 3E, 7F		LD A, 127
0407 DB, FE		IN A, (254)
0409 1F		RR A
0410 D0		RET NC
0411 A9		XOR C
0412 E6, 20		AND 32 SAVE BIT 5
0414 28, F3		JR Z, 243 (0403) LOAD SAMPLE
0416 79		LD A, C
0417 2F		CPL
0418 4F		LD C, A
0419 E6, 07		AND 7
0421 F6, 08		OR B SET BIT 4
0423 D3, FE		OUT (254), A
0425 37		SCF
0426 C9		RET

SAVE/LOAD/VERIFY/MERGE COMMAND ROUTINE

0427 3A, 74, 5C	SLVM	LD A, (23668) T ADDR LOW
0430 0E, E1, 19		LD BC, 6625
0433 91		SUB C (-225)
0434 32, 74, 5C		LD (23668), A T ADDR LOW
0437 DD, E5		PUSH IX 00=SAVE, 01=LOAD
0439 D9		EXX 02=VERIFY, 03=MERGE
0440 21, EF, 1B		LD HL, 7151 EXPECT EXPRESSION
0443 E5		PUSH HL SET UP CALL BANK
0444 2E, 00		LD L, 0
0446 26, FF		LD H, 255
0448 E5		PUSH HL
0449 21, 00, 00		LD HL, 0
0452 E5		PUSH HL
0453 E5		PUSH HL
0454 D9		EXX

0455 CD,99,0F		CALL 3993 CALL BANK
0458 DD,E1		POP IX
0460 FD,CB,01,7E		BIT 7, (IY+1) NEED INTERPRET?
0464 28,66		JR Z, 102 (0568) SAVE TITLE
0466 01,11,00		LD BC, 17
0469 3A,74,5C		LD A, (23668) T ADDR LOW
0472 A7		AND A CLEAR FLAGS
0473 28,02		JR Z, 2 (0477) SAVE SPACE
0475 0E,22		LD C, 34
0477 DD,E5	SAVE SPACE	PUSH IX
0479 D9		EXX
0480 21,30,00		LD HL 48 INSERT BC SPACES
0483 E5		PUSH HL
0484 2E,00		LD L, 0
0486 26,FF		LD H, 255
0488 E5		PUSH HL
0489 21,00,00		LD HL, 0
0492 E5		PUSH HL
0493 E5		PUSH HL
0494 D9		EXX
0495 CD,99,0F		CALL 3993 CALL BANK
0498 DD,E1		POP IX
0500 D5		PUSH DE
0501 DD,E1		POP IX
0503 06,0B		LD B, 11 CLEAR 11 SPACES
0505 3E,20		LD A, 32 SPACE
0507 12	SAVE BLANK	LD (DE), A
0508 13		INC DE
0509 10,FC		DJNZ, 252 (0507) SAVE BLANK
0511 DD,36,01,FF		LD (IX+1), 255 NULL NAME
0515 DD,E5		PUSH IX
0517 D9		EXX
0518 21,AF,2F		LD HL, 12207 POP STR
0521 E5		PUSH HL
0522 2E,00		LD L, 0
0524 26,FF		LD H, 255
0526 E5		PUSH HL
0527 21,00,00		LD HL, 0
0530 E5		PUSH HL
0531 E5		PUSH HL
0532 D9		EXX
0533 CD,99,0F		CALL 3993 CALL BANK
0536 DD,E1		POP IX
0538 21,F6,FF		LD HL, 65526 (-10)
0541 0B		DEC BC
0542 09		AND HL, BC
0543 03		INC BC
0544 30,0F		JR NC, 15 (0561) SAVE NAME
0546 3A,74,5C		LD A (23668) T ADDR LOW (FLAG)
0549 A7		AND A CLEAR FLAGS
0550 20,02		JR NZ, 2 SAVE NULL NAME
0552 CF	ERR F	RST 8 ERROR
0553 0E		F Invalid file name
0554 78	SAVE NULL NAME	LD C, (HL)
0555 B1		OR C

0556 28,0A		JR Z, 10 (0568) SAVE TITLE
0558 01,0A,00		LD BC, 10
0561 DD,E5	SAVE NAME	PUSH IX
0563 E1		POP HL HL = IX
0564 23		INC HL
0565 EB		EX DE, HL
0566 ED,B0		LDIR
0568 DD,E5	SAVE TITLE	PUSH IX
0570 D9		EXX
0571 21,18,00		LD HL, 24 GET CHAR
0574 E5		PUSH HL
0575 2E,00		LD L, 0
0577 26,FF		LD H, 255
0579 E5		PUSH HL
0580 21,00,00		LD HL, 0
0583 E5		PUSH HL
0584 E5		PUSH HL
0585 D9		EXX
0586 CD,99,0F		CALL 3993 CALL BANK
0589 DD,E1		POP IX
0591 FE,E4	SAVE DATA	CP 228 DATA?
0593 C2,F2,02		JP NZ, (0754) SAVE SCREEN\$
0596 3A,74,5C		LD A, (23668) T ADDR LOW FLAG)
0599 FE,03		CP 3 MERGE CANT NAME DATA
0601 CA,D9,08		JP Z, 2265 EXIT ERROR
0604 DD,E5		PUSH IX
0606 D9		EXX
0607 21,20,00		LD HL, 32 NEXT CHAR
0610 E5		PUSH HL
0611 2E,00		LD L, 0
0613 26,FF		LD H, 255
0615 E5		PUSH HL
0616 21,00,00		LD HL, 0
0619 E5		PUSH HL
0620 E5		PUSH HL
0621 D9		EXX
0622 CD,99,0F		CALL 3993 CALL BANK
0625 D9		EXX
0626 21,70,2C		LD HL, 11376 FIND VARIABLE
0629 E5		PUSH HL
0630 2E,00		LD L, 0
0632 26,FF		LD H, 255
0634 E5		PUSH HL
0635 21,00,00		LD HL, 0
0638 E5		PUSH HL
0639 E5		PUSH HL
0640 D9		EXX
0641 CD,99,0F		CALL 3993 CALL BANK
0644 DD,E1		POP IX
0646 CB,F9		SET 7, C
0648 30,0B		JR NC, 11 (0664) SAVE VAR OLD
0650 21,00,00		LD HL, 0
0653 3A,74,5C		LD A, (23668) T ADDR LOW (FLAG)
0656 3D		DEC A
0657 28,16		JR Z, 22 (0681) SAVE VAR NEW

0659 CF	ERR 2	RST 8 ERROR
0660 01		2 Variable not found
0661 C2,D9,08	EXIT ERROR	JP NZ, 2265 EXIT ERROR
0664 FD,CB,01,7E	SAVE VAR OLD	BIT 7, (IY+1) INTERPRET?
0668 28,18		JR Z, 24 (0694) SAVE DATA-1
0670 23		INC HL
0671 7E		LD A, (HL)
0672 DD,77,0B		LD (IX+11), A
0675 23		INC HL
0676 7E		LD A, (HL)
0677 DD,77,0C		LD (IX+12), A
0680 23		INC HL
0681 DD,77,0E	SAVE VAR NEW	LD (IX+14), A
0684 3E,01		LD A, 1
0686 CB,71		BIT 6, C
0688 28,01		JR Z, 1 (0691) SAVE VAR TYPE
0690 3C		INC A
0691 DD,77,00	SAVE VAR TYPE	LD (IX+0), A
0694 EB	SAVE DATA-1	EX DE, HL
0695 DD,E5		PUSH IX
0697 D9		EXX
0698 21,20,00		LD HL, 32 NEXT CHAR
0701 E5		PUSH HL
0702 2E,00		LD L, 0
0704 26,FF		LD H, 255
0706 E5		PUSH HL
0707 21,00,00		LD HL, 0
0710 E5		PUSH HL
0711 E5		PUSH HL
0712 D9		EXX
0713 CD,99,0F		CALL 3993 CALL BANK
0716 DD,E1		POP IX
0718 FE,29		CP 41)?
0720 20,C3		JR NZ, 195 (0664) EXIT ERROR
0722 DD,E5		PUSH IX
0724 D9		EXX
0725 21,20,00		LD HL, 32 NEXT CHAR
0728 E5		PUSH HL
0729 2E,00		LD L, 0
0731 26,FF		LD H, 255
0733 E5		PUSH HL
0734 21,00,00		LD HL, 0
0737 E5		PUSH HL
0738 E5		PUSH HL
0739 D9		EXX
0740 CD,99,0F		CALL 3993 CALL BANK
0743 DD,E1		POP IX
0745 FD,CB,01,7E		BIT 7, (IY+1) INTERPRET?
0749 C8		RET Z
0750 EB		EX DE, HL
0751 C3,C9,04		JP 1225 SAVE ALL
0754 FE,AA	SAVE SCREEN\$	CP 170 SCREEN\$
0756 20,38		JR NZ, 56 (0814) SAVE CODE
0758 3A,74,5C		LD A, (23668) T ADDR LOW (FLAG)
0761 FE,03		CP 3 NO MERGE CALLED DATA

0763 CA,D9,08		JP Z, 2265 EXIT ERROR
0766 DD,E5		PUSH IX
0768 D9		EXX
0769 21,20,00		LD HL, 32 NEXT CHAR
0772 E5		PUSH HL
0773 2E,00		LD L, 0
0775 26,FF		LD H, 255
0777 E5		PUSH HL
0778 21,00,00		LD HL, 0
0781 E5		PUSH HL
0782 E5		PUSH HL
0783 D9		EXX
0784 CD,99,0F		CALL 3993 CALL BANK
0787 DD,E1		POP IX
0789 FD,CB,01,7E		BIT 7, (IY+1) INTERPRET?
0793 C8		RET Z
0794 DD,36,0B,00		LD (IX+11), 0
0798 DD,36,0C,1B		LD (IX+12), 27
0802 21,00,40		LD HL, 16384 DISPLAY FILE ADDR
0805 DD,75,0D		LD (IX+13), L LOAD ADDR
0808 DD,7E,0E		LD (IX+14), H
0811 C3,40,04		JP 1088 SAVE TYPE 3
0814 FE,AF	SAVE CODE	CP 175 CODE?
0816 C2,47,04		JP NZ 1095 SAVE LINE?
0819 3A,74,56		LD A, (23668) T ADDR LOW (FLAG)
0822 FE,03		CP 3
0824 CA,D9,08		JP Z, 2265 EXIT ERROR
0827 DD,E5		PUSH IX
0829 D9		EXX
0830 21,20,00		LD HL, 32 NEXT CHAR
0833 E5		PUSH HL
0834 2E,00		LD L, 0
0836 26,FF		LD H, 255
0838 E5		PUSH HL
0839 21,00,00		LD HL, 0
0842 E5		PUSH HL
0843 E5		PUSH HL
0844 D9		EXX
0845 CD,99,0F		CALL 3993 CALL BANK
0848 D9		EXX
0849 21,E7,21		LD HL, 8679 TERM?
0852 E5		PUSH HL
0853 2E,00		LD L, 0
0855 26,FF		LD H, 255
0857 E5		PUSH HL
0858 21,00,00		LD HL, 0
0861 E5		PUSH HL
0862 E5		PUSH HL
0863 D9		EXX
0864 CD,99,0F		CALL 3993 CALL BANK
0867 DD,E1		POP IX
0869 20,20		JR NZ, 32 (0903) SAVE CODE-1
0871 3A,74,5C		LD A, (23668) T ADDR LOW (FLAG)
0874 A7		AND A A=0?
0875 CA,D9,08		JP Z, 2265 EXIT ERROR

0878 DD,E5		PUSH IX
0880 D9		EXX
0881 21,51,1C		LD HL, 7249 STK 0
0884 E5		PUSH HL
0885 2E,00		LD L, 0
0887 26,FF		LD H, 255
0889 E5		PUSH HL
0890 21,00,00		LD HL, 0
0893 E5		PUSH HL
0894 E5		PUSH HL
0895 D9		EXX
0896 CD,99,0F		CALL 3993 CALL BANK
0899 DD,E1		POP IX
0901 18,35		JR 53 (0956) SAVE CODE-2
0903 DD,E5	SAVE CODE-1	PUSH IX
0905 D9		EXX
0906 21,E5,1B		LD HL, 7141 TEM 6(EXPECT 1 #)
0909 E5		PUSH HL
0910 2E,00		LD L, 0
0912 26,FF		LD H, 255
0914 E5		PUSH HL
0915 21,00,00		LD HL, 0
0918 E5		PUSH HL
0919 E5		PUSH HL
0920 D9		EXX
0921 CD,99,0F		CALL 3993 CALL BANK
0924		EXX
0925 21,18,00		LD HL, '24 GET CHAR
0928 E5		PUSH HL
0929 2E,00		LD L, 0
0931 26,FF		LD H, 255
0933 E5		PUSH HL
0934 21,00,00		LD HL, 0
0937 E5		PUSH HL
0938 E5		PUSH HL
0939 D9		EXX
0940 CD,99,0F		CALL 3993 CALL BANK
0943 DD,E1		POP IX
0945 FE,2C		CP 44 ", "?"
0947 28,20		JR Z, 32 (0981) GET #
0949 3A,74,5C		LD A, (23668) T ADDR LOW (FLAG)
0952 A7		AND A A =0?
0953 CA,D9,08		JP Z, 2265 EXIT ERROR
0956 DD,E5	SAVE CODE-2	PUSH IX
0958 D9		EXX
0959 21,51,1C		LD HL, 7249 STK 0
0962 E5		PUSH HL
0963 3E,00		LD L, 0
0965 26,FF		LD H, 255
0967 E5		PUSH HL
0968 21,00,00		LD HL, 0
0971 E5		PUSH HL
0972 E5		PUSH HL
0973 D9		EXX
0974 CD,99,0F		CALL 3993 CALL BANK

0977 DD,E1		POP IX
0979 18,2A		JR 42 (1023) SAVE CODE-4
0981 DD,E5	GET #	PUSH IX
0983 D9		EXX
0984 21,20,00		LD HL, 32 NEXT CHAR
0987 E5		PUSH HL
0988 2E,00		LD L, 0
0990 26,FF		LD H, 255
0992 E5		PUSH HL
0993 21,00,00		LD HL, 0
0996 E5		PUSH HL
0997 E5		PUSH HL
0998 D9		EXX
0999 CD,99,0F		CALL 3993 CALL BANK
1002 D9		EXX
1003 21,E5,1B		LD HL, 7141 TEM 6(EXPECT 1#)
1006 E5		PUSH HL
1007 2E,00		LD L, 0
1009 26,FF		LD H, 255
1011 E5		PUSH HL
1012 21,00,00		LD HL, 0
1015 E5		PUSH HL
1016 E5		PUSH HL
1017 D9		EXX
1018 CD,99,0F		CALL 3993 CALL BANK
1021 DD,E1		POP IX
1023 FD,CB,01,7E	SAVE CODE-4	BIT 7, (IX+1) INTERPRET?
1027 C8		RET Z
1028 DD,E5		PUSH IX
1030 D9		EXX
1031 21,23,1F		LD HL, 7971 FIX U (FIND INT)
1034 E5		PUSH HL
1035 2E,00		LD L, 0
1037 26,FF		LD H, 255
1039 E5		PUSH HL
1040 21,00,00		LD H, 0
1043 E5		PUSH HL
1044 E5		PUSH HL
1045 D9		EXX
1046 CD,99,0F		CALL 3993 CALL BANK
1049 DD,E1		POP IX
1051 DD,71,0B		LD (IX+11), C LENGTH
1054 DD,70,0C		LD (IX+12), B
1057 DD,E9		PUSH IX
1059 D9		EXX
1060 21,23,1F		LD HL, 7971 FIX U (FIND INT)
1063 E5		PUSH HL
1064 2E,00		LD L, 0
1066 26,FF		LD H, 255
1068 E5		PUSH HL
1069 21,00,00		LD HL, 0
1072 E5		PUSH HL
1073 E5		PUSH HL
1074 D9		EXX
1075 CD,99,0F		CALL 3993 CALL BANK

1078 DD,E1		POP IX
1080 DD,71,0D		LD (IX+13), C STARTING ADDR
1083 DD,70,0E		LD (IX+14), D
1086 60		LD H, B
1087 69		LD L, C
1088 DD,36,00,03	SAVE TYPE 3	LD (IX+0), 3 (SCREEN# & CODE)
1092 C3,C9,04		JP 1225 SAVE ALL
1095 FE,CA	SAVE LINE?	CP 202 LINE?
1097 28,0B		JR Z, 11 (1110) SAVE LINE 1
1099 FD,CB,01,7E		BIT 7, (IY+1) INTERPRET?
1103 C8		RET Z
1104 DD,36,0E,80		LD (IX+14), 128 END MARKER
1108 18,53		JR 83 (1193) SAVE TYPE 0
1110 3A,74,5C	SAVE LINE 1	LD A, (23668) T ADDR LOW (FLAG)
1113 A7		AND A A=0?
1114 C2,D9,0B		JP NZ, 2265 EXIT ERROR
1117 DD,E5		PUSH IX
1119 D9		EXX
1120 21,20,00		LD HL, 32 NEXT CHAR
1123 E5		PUSH HL
1124 2E,00		LD L, 0
1126 26,FF		LD H, 255
1128 E5		PUSH HL
1129 21,00,00		LD HL, 0
1132 E5		PUSH HL
1133 E5		PUSH HL
1134 D9		EXX
1135 CD,99,0A		CALL 3993 CALL BANK
1138 D9		EXX
1139 21,E5,1B		LD HL, 7141 TEM 6 (EXPECT 1 #)
1142 E5		PUSH HL
1143 2E,00		LD L, 0
1145 26,FF		LD H, 255
1147 E5		PUSH HL
1148 21,00,00		LD HL, 0
1151 E5		PUSH HL
1152 E5		PUSH HL
1153 D9		EXX
1154 CD,99,0F		CALL 3993 CALL BANK
1157 DD,E1		POP IX
1159 FD,CB,01,7E		BIT 7, (IY+1) INTERPRET?
1163 C8		RET Z
1164 DD,E5		PUSH IX
1166 D9		EXX
1167 21,23,1F		LD HL, 7971 FIX U (FIND INT)
1170 E5		PUSH HL
1171 2E,00		LD L, 0
1173 26,FF		LD H, 255
1175 E5		PUSH HL
1176 21,00,00		LD HL, 0
1179 E5		PUSH HL
1180 E5		PUSH HL
1181 D9		EXX
1182 CD,99,0F		CALL 3993 CALL BANK
1185 DD,E1		POP IX

1187 DD,71,0D		LD (IX+12), C LENGTH
1190 DD,70,0E		LD (IX+13), B
1193 DD,36,00,00	SAVE TYPE 0	LD (IX+0), 0
1197 2A,59,5C		LD HL, (23641) E LINE
1200 ED,5B,53,5C		LD DE, (23635) PROG
1204 37		SCF
1205 ED,52		SBC HL, DE HL= TOTAL BYTES
1207 DD,75,0B		LD (IX+11), L TOTAL BYTES
1210 DD,74,0C		LD (IX+12), H
1213 2A,4B,5C		LD HL, (23627) VARS
1216 ED,52		SBC HL, DE HL= PROG LEN
1218 DD,75,0F		LD (IX+15), L PROG LEN
1221 DD,74,10		LD (IX+16), H
1224 EB		EX DE, HL
1225 3A,74,5C	SAVE ALL	LD A, (23668) T ADDR LOW (FLAG)
1228 A7		AND A A=0?
1229 CA,51,08		JF Z, 2129 SAVE CONTROL
1232 E5		PUSH HL
1233 01,11,00		LD BC, 17 TITLE LENGTH
1236 DD,09		ADD IX, BC
1238 DD,E5	LOAD HEADER	PUSH IX
1240 11,11,00		LD DE, 17 HEADER LEN
1243 AF		AND A CLEAR FLAGS
1244 37		SCF
1245 CD,FC,00		CALL 252 READ TAPE
1248 DD,E1		POP IX
1250 30,F2		JR NC, 242 (1238) LOAD HEADER
1252 3E,F2		LD A, 254
1254 DD,E5		PUSH IX
1256 D9		EXX
1257 21,30,12		LD HL, 4656 SELECT CHAN
1260 E5		PUSH HL
1261 2E,00		LD L, 0
1263 26,FF		LD H, 255
1265 E5		PUSH HL
1266 21,00,00		LD HL, 0
1269 E5		PUSH HL
1270 E5		PUSH HL
1271 D9		EXX
1272 CD,99,0F		CALL 3993 CALL BANK
1275 DD,E1		POP IX
1277 FD,36,52,03		LD (IY+82), 3 SCROLL COUNT
1281 0E,80		LD C, 128 SIGNAL NO MATCH
1283 DD,7E,00		LD A, (IX+0) NEW SAVE TYPE
1286 DD,BE,EF		CP (IX+239) OLD SAVE TYPE
1289 20,02		JR NZ, 2 (1293) LOAD TAPE
1291 0E,F6		LD C, 246 SIGNAL MATCH
1293 FE,04	LOAD TYPE	CP 4 NO FLAG >4
1295 30,C5		JR NC, 197 (1238) LAOD HEADER
1297 11,A8,3C		LD DE, 15528 TAPE MESSAGE ADDR
1300 C5		PUSH BC
1301 DD,E5		PUSH IX
1303 D9		EXX
1304 21,37,0F		LD HL, 1855 PUT MESSAGE (PROG: etc
1307 E5		PUSH HL

1308 2E,00		LD L, 0
1310 26,FF		LD H, 255
1312 E5		PUSH HL
1313 21,00,00		LD HL, 0
1316 E5		PUSH HL
1317 E5		PUSH HL
1318 D9		EXX
1319 CD,99,0F		CALL 3993 CALL BANK
1322 DD,E1		POP IX
1324 C1		POP BC
1325 DD,E5		PUSH IX
1327 D1		POP DE
1328 21,FO,FF		LD HL, 65520 (-17)ADDR OLD NAME
1331 19		ADD HL, DE
1332 06,0A		LD B, 10 NAME IS 10 LONG
1334 7E		LD A, (HL)
1335 3C		INC A A WAS 255?
1336 20,03		JR NZ, 3 (1341) LOAD NAME
1338 79		LD A, C
1339 80		ADD A, B
1340 4F		LD C, A
1341 13	LOAD NAME	INC DE COMPARE NAMES
1342 1A		LD A, (DE)
1343 BE		CP (HL)
1344 23		INC HL
1345 20,01		JR NZ, 1 (1348) LOAD CHAR PR
1347 0C		INC C
1348 DD,E5	LD CHAR PR	PUSH IX
1350 D9		EXX
1351 21,10,00		LD HL, 16 PRINT CHAR
1354 E5		PUSH HL
1355 2E,00		LD L, 0
1357 26,FF		LD H, 255
1359 E5		PUSH HL
1360 21,00,00		LD HL, 0
1363 E5		PUSH HL
1364 E5		PUSH HL
1365 D9		EXX
1366 CD,99,0F		CALL 3993 CALL BANK
1369 DD,E1		POP IX
1371 10,E0		DJNZ, 224 (1341) LOAD NAME
1373 CB,79		BIT 7, C MATCH?
1375 C2,D6,04		JP NZ, 1238 LOAD HEADER
1378 3E,0D		LD A, 13 ENTER
1380 DD,E5		PUSH IX
1382 D9		EXX
1383 21,10,00		LD HL, 16 PRINT CHAR
1386 E5		PUSH HL
1387 2E,00		LD L, 0
1389 26,FF		LD H, 255
1391 E5		PUSH HL
1392 21,00,00		LD HL, 0
1395 E5		PUSH HL
1396 E5		PUSH HL
1397 D9		EXX

1398 CD,99,0F
 1401 DD,E1
 1403 E1
 1404 DD,7E,00
 1407 FE,03
 1409 28,0C
 1411 3A,74,5C
 1414 3D
 1415 CA,CC,05
 1418 FE,02
 1420 CA,E5,06

CALL 3993 CALL BANK
 POP IX
 POP HL
 LD A, (IX+0)
 CP 3
 JR Z, 12 (1423) VERIFY CONTROL
 LD A, (23668) T ADDR LOW (FLAG)
 DEC A
 JF Z, 1484 LOAD (A WAS 1)
 CP 2
 JF Z, 1765 MERGE (A WAS 3)

VERIFY CONTROL ROUTINE

1423 E5 VERIFY CONTROL
 1424 DD,6E,FA
 1427 DD,66,FB
 1430 DD,5E,0B
 1433 DD,56,0C
 1436 7C
 1437 B5
 1438 28,0D
 1440 ED,52
 1442 38,26
 1444 28,07
 1446 DD,7E,00
 1449 FE,03
 1451 20,1D
 1453 E1 VERIFY CONT-1
 1454 7C
 1455 B5
 1456 20,06
 1458 DD,6E,0D
 1461 DD,66,0E
 1464 E5 DF LOAD
 1465 DD,E1
 1467 3A,74,5C
 1470 FE,02
 1472 37
 1473 20,01
 1475 A7
 1476 3E,FF SIGNAL VERIFY

PUSH HL
 LD L, (IX+250)
 LD H, (IX+251)
 LD E, (IX+11)
 LD D, (IX+12)
 LD A, H
 OR L HL=0? NO LEN SPECIFIED
 JR Z, 13 (1453) VERIFY CONT-1
 SBC HL, DE
 JR C, 38 (1482) ERR R
 JR Z, 7 (1453) VERIFY COMT-1
 LD A, (IX+0) CODE
 CP 3
 JR NZ, 29 ERR R
 POP HL
 LD A, H
 OR L HL=0?
 JR NZ, 6 (1464) DO LOAD
 LD L, (IX+13) USE NEW START ADDR
 LD H, (IX+14)
 PUSH HL
 POP IX HL TO IX
 LD A, (23668) T ADDR LOW (FLAG)
 CP 2
 SCF
 JR NZ, 1 (1476) SIGNAL VERIFY
 AND A CLEAR FLAGS
 LD A, 255

LOAD A DATA BLOCK SUBROUTINE

1478 CD,FC,00 LOAD BLOCK
 1481 D8
 1482 CF ERR R
 1483 1A

CALL 252 READ TAPE
 RET C
 RST 8 ERROR
 R Tape loading error

LOAD CONTROL ROUTINE

1478 DD,5E,0B LOAD
 1487 DD,56,0C
 1490 E5
 1491 7C
 1492 B5
 1493 20,06

LD E, (IX+11) TOTAL LENGTH
 LD D, (IX+12)
 PUSH HL
 LD A, H
 OR L HL=0?
 JR NZ, 6 (1501) LOAD CONT-1

1495-13		INC DE
1496 13		INC DE
1497 13		INC DE
1498 EB		EX DE, HL
1499 18,0C		JR 12 (1513) LOAD CONT-2
1501 DD,6E,FA	LOAD CONT-1	LD L, (IX+250) SIZE OF ARRAY
1504 DD,66,FB		LD H, (IX+251)
1507 EB		EX DE, HL
1508 37		SCF
1509 ED,52		SBC HL, DE
1511 38,1D		JR C, 29 (1542) LOAD DATA
1513 11,05,00	LOAD CONT-2	LD DE, 5
1516 19		ADD HL, DE
1517 44		LD B, H
1518 4D		LD C, L
1519 DD,E5		PUSH IX
1521 D9		EXX
1522 21,8B,1F		LD HL, 8123 CHECK SIZE
1525 E5		PUSH HL
1526 2E,00		LD L, 0
1528 26,FF		LD H, 255
1530 E5		PUSH HL
1531 21,00,00		LD HL, 0
1534 E5		PUSH HL
1535 E5		PUSH HL
1536 D9		EXX
1537 CD,99,0F		CALL 3993 CALL BANK
1540 DD,E1		POP IX
1542 E1	LOAD DATA	POP HL
1543 DD,7E,00		LD A, (IX+0) CODE
1546 A7		AND A CLEAR FLAGS
1547 28,66		JR Z, 102 (1651) LOAD PROGRAM
1549 7C		LD A, H
1550 B5		OR L HL=0?
1551 28,27		JR Z, 39 (1592) NEW ARRAY
1553 2B		DEC HL
1554 46		LD B, (HL) GET LENGTH
1555 2B		DEC HL
1556 4E		LD C, (HL)
1557 2B		DEC HL
1558 03		INC BC
1559 03		INC BC
1560 03		INC BC
1561 DD,22,5F,5C		LD (23647), IX X POINTER
1565 DD,E5		PUSH IX
1567 D9		EXX
1568 21,50,17		LD HL, 5968 DEL REC (KILL OLD
1571 E5		PUSH HL
1572 2E,00		LD L, 0
1574 26,FF		LD H, 255
1576 E5		PUSH HL
1577 21,00,00		LD HL, 0
1580 E5		PUSH HL
1581 E5		PUSH HL
1582 D9		EXX

1583 CD,99,0F	CALL 3993 CALL BANK
1586 DD,E1	POP IX DISCARD
1588 DD,2A,5F,5C	LD IX, (23647) X POINTER
1592 2A,59,5C NEW ARRAY	LD HL, (23641) E LINE
1595 2B	DEC HL
1596 DD,4E,0B	LD C, (IX+11) NEW ARRAY LENGTH
1599 DD,46,0C	LD B, (IX+12)
1602 C5	PUSH BC
1603 03	INC BC
1604 03	INC BC
1605 03	INC BC
1606 DD,7E,FD	LD A, (IX+253) NAME
1609 F5	PUSH AF
1610 DD,E5	PUSH IX
1612 D9	EXX
1613 21,BB,12	LD HL, 4795 INSERT BC SPACES
1616 E5	PUSH HL
1617 2E,00	LD L, 0
1619 26,FF	LD H, 255
1621 E5	PUSH HL
1622 21,00,00	LD HL, 0
1625 E5	PUSH HL
1626 E5	PUSH HL
1627 D9	EXX
1628 CD,99,0F	CALL 3993 CALL BANK
1631 DD,E1	POP IX
1633 23	INC HL
1634 F1	POP AF
1635 77	LD (HL), A NAME OF ARRAY
1636 D1	POP DE
1637 23	INC HL
1638 73	LD (HL), E LENGTH
1639 23	INC HL
1640 72	LD (HL), D
1641 23	INC HL
1642 E5	PUSH HL
1643 DD,E1	POP IX HL TO IX
1645 37	SCF
1646 3E,FF	LD A, 255 CODE FOR ARRAY
1648 C3,C6,05	JF 1478 LOAD BLOCK
1651 EB LOAD PROGRAM	EX DE, HL
1652 2A,59,5C	LD HL, (23641) E LINE
1655 2B	DEC HL
1656 DD,22,5F,5C	LD (23447), IX X POINTER
1660 DD,4E,0B	LD C, (IX+11) LENGTH
1663 DD,46,0C	LD B, (IX+12)
1666 C5	PUSH BC
1667 DD,E5	PUSH IX
1669 D9	EXX
1670 21,4D,17	LD HL, 5965 DEL REC(RECLAIM-1)
1673 E5	PUSH HL (KILL OLD PROGRAM)
1674 2E,00	LD L, 0
1676 26,FF	LD H, 255
1678 E5	PUSH HL
1679 21,00,00	LD HL, 0

1682 E5		PUSH LH
1683 E5		PUSH HL
1684 D9		EXX
1685 CD,99,0F		CALL 3993 CALL BANK
1688 DD,E1		POP IX
1690 C1		POP BC
1691 E5		PUSH HL
1692 C5		PUSH BC
1693 DD,E5		PUSH IX
1695 D9		EXX
1696 21,BB,12		LD HL, 4795 INSERT BC SPACES
1699 E5		PUSH HL
1700 2E,00		LD L, 0
1702 26,FF		LD H, 255
1704 E5		PUSH HL
1705 21,00,00		LD HL, 0
1708 E5		PUSH HL
1709 E5		PUSH HL
1710 D9		EXX
1711 CD,99,0F		CALL 3993 CALL BANK
1714 DD,E1		POP IX
1716 DD,2A,5F,5C		LD IX, (23647) X POINTER
1720 23		INC HL
1721 DD,4E,0F		LD C, (IX+15) VARS LENGTH
1724 DD,46,10		LD B, (IX+16)
1727 09		ADD HL, BC
1728 22,4B,5C		LD (23627), HL VARS
1731 DD,66,0E		LD H, (IX+14) LINE #
1734 7C		LD A, H
1735 E6,C0		AND 192
1737 20,0A		JR NZ, 10 (1749) NO LINE #
1739 DD,6E,0D		LD L, (IX+13) REST OF LINE #
1742 22,42,5C		LD (23618), HL NEW PPC
1745 FD,36,0A,00		LD (IY+10), 0 SET NS PPC=0
1749 D1	NO LINE #	POP DE
1750 DD,E1		POP IX
1752 37		SCF
1753 3E,FF		LD A, 255 DATA BLOCK ONLY COLDE
1755 2A,53,5C		LD HL, (23635) PROGRAM
1758 2B		DEC HL
1759 22,57,5C		LD (23639), HL DATA ADDR
1762 C3,C6,05		JP 1478 LOAD BLOCK
MERGE CONTROL ROUTINE		
1765 DD,4E,0B	MERGE	LD C, (IX+11) BLOCK LENGTH
1768 DD,46,0C		LD B, (IX+12)
1771 C5		PUSH BC
1772 03		INC BC
1773 DD,E5		PUSH IX
1775 D9		EXX
1776 21,30,00		LD HL, 48 INSERT LINE
1779 E5		PUSH HL
1780 2E,00		LD L, 0
1782 26,FF		LD H, 255
1784 E5		PUSH HL

1785	21,00,00	LD HL, 0
1788	E5	PUSH HL
1789	E5	PUSH HL
1790	D9	EXX
1791	CD,99,0F	CALL 3993 CALL BANK
1794	DD,E1	POP IX
1796	36,80	LD (HL), 128 MARKER
1798	EB	EX DE, HL
1799	D1	POP DE
1800	E5	PUSH HL
1801	E5	PUSH HL
1802	DD,E1	POP IX HL TO IX
1804	37	SCF
1805	3E,FF	LD A, 255 CODE FOR MERGE
1807	CD,C6,05	CALL 1478 READ TAPE
1810	E1	POP HL
1811	ED,5B,53,5C	LD DE, (23635) E PPC
1815	7E MERGE NEW LOOP	LD A, (HL)
1816	E6,C0	AND 192 LEGAL LINE #?
1818	20,2D	JR NZ, 45 (1865) MERGE VAR LOOP
1820	1A MERGE OLD LOOP	LD A, (DE)
1821	13	INC DE
1822	BE	CP (HL)
1823	23	INC HL
1824	20,02	JR NZ, 2 (1828) MERGE OLD LINE-1
1826	1A	LD A, (DE)
1827	BE	CP (HL)
1828	1B MERGE OLD LINE-1	DEC DE
1829	2B	DEC HL
1830	30,1C	JR NC, 28 (1860) MERGE NEW LINE-2
1832	E5	PUSH HL
1833	EB	EX DE, HL
1834	DD,E5	PUSH IX
1836	D9	EXX
1837	21,20,17	LD HL, 5920 RECORD LENGTH
1840	E5	PUSH HL
1841	2E,00	LD L, 0
1843	26,FF	LD H, 255
1845	E5	PUSH HL
1846	21,00,00	LD HL, 0
1849	E5	PUSH HL
1850	E5	PUSH HL
1851	D9	EXX
1852	CD,99,0F	CALL 3993 CALL BANK
1855	DD,E1	POP IX
1857	E1	POP HL
1858	18,D8	JR 216 (1820) MERGE OLD LOOP
1860	CD,99,07 MERGE NEW LINE-2	CALL 1945 MERGE ENTER
1863	18,CE	JR 206 (1815) MERGE NEW LOOP
1865	7E MERGE VAR LOOP	LD A, (HL)
1866	4F	LD C, A
1867	FE,80	CP 128 END?
1869	C8	RET Z
1870	E5	PUSH HL
1871	2A,4B,5C	LD HL, (23627) VARS

1874 7E	MERGE OLD VAR P	LD A, (HL)
1875 FE,80		CP 128 END MARKER?
1877 28,39		JR Z, 57 (1936) MERGE VAR L-2
1879 B9		CP C
1880 28,1C		JR Z, 28 (1910) MERGE VAR OLD V-2
1882 C5	MERGE OLD V-1	PUSH BC
1883 DD,E5		PUSH IX
1885 D9		EXX
1886 21,20,17		LD HL, 5920 RECORD LENGTH
1889 E5		PUSH HL
1890 2E,00		LD L, 0
1892 26,FF		LD H, 255
1894 E5		PUSH HL
1895 21,00,00		LD HL, 0
1898 E5		PUSH HL
1899 E5		PUSH HL
1900 D9		EXX
1901 CD,99,0F		CALL 3993 CALL BANK
1904 DD,E1		POP IX
1906 C1		POP BC
1907 EB		EX DE, HL
1908 18,DC		JR 220 (1874) MERGE OLD VAR P
1910 E6,E0	MERGE VAR OLD V-2	AND 224 SAVE BITS 7,6,5 & 2
1912 FE,A0		CP 160 LONG NAME VAR?
1914 20,12		JR NZ, 18 (1934) MERGE OLD VP
1916 D1		POP DE
1917 D5		PUSH DE
1918 E5		PUSH HL
1919 23	MERGE OLD V-3	INC HL
1920 13		INC DE
1921 1A		LD A, (DE) COMPARE VAR NAMES
1922 BE		CP (HL)
1923 20,06		JR NZ, 6 (1931) MERGE OLD V-4
1925 17		RL A
1926 30,F7		JR NC, 247 (1919) MERGE OLD V-3
1928 E1		POP HL
1929 18,03		JR 3 (1934) MERGE VAR L-1
1931 E1	MERGE OLD V-4	POP HL
1932 18,CC		JR 204 (1882) MERGE OLD V-1
1934 3E,FF	MERGE VAR L-1	LD A, 255
1936 D1	MERGE VAR L-2	POP DE
1937 EB		EX DE, HL
1938 3C		INC A
1939 37		SCF
1940 CD,99,07		CALL 1945 MERGE ENTER
1943 18,B0		JR 176 (1865) MERGE VAR LOOP

MERGE A LINE OR VARIABLE SUBROUTINE

1945 20,34	MERGE ENTER	JR NZ, 52 (1999) MERGE ENT-1
1947 08		EX AF, AF'
1948 22,5F,5C		LD (23647), HL X POINTER
1951 EB		EXX
1952 DD,E5		PUSH IX
1954 D9		EXX
1955 21,20,17		LD HL, 5920 RECORD LENGTH

1958 E5	PUSH HL
1959 2E,00	LD L, 0
1961 26,FF	LD H, 255
1963 E5	PUSH HL
1964 21,00,00	LD HL, 0
1967 E5	PUSH HL
1968 E5	PUSH HL
1969 D9	EXX
1970 CD,99,0F	CALL 3993 CALL BANK
1973 D9	EXX
1974 21,50,17	LD HL, 5968 DEL RECORD
1977 E5	PUSH HL
1978 3E,00	LD L, 0
1980 26,FF	LD H, 255
1982 E5	PUSH HL
1984 21,00,00	LD HL, 0
1987 E5	PUSH HL
1988 E5	PUSH HL
1989 CD,99,0F	CALL 3993 CALL BANK
1992 DD,E1	POP IX
1994 EB	EX DE, HL
1995 2A,5F,5C	LD HL, (23647) X POINTER
1998 08	EX AF, AF'
1999 08	EX AF, AF'
2000 D5	PUSH DE
2001 DD,E5	PUSH IX
2003 D9	EXX
2004 21,20,17	LD HL, 5920 RECORD LENGTH
2007 E5	PUSH HL
2008 2E,00	LD L, 0
2010 26,FF	LD H, 255
2012 E5	PUSH HL
2013 21,00,00	LD HL, 0
2016 E5	PUSH HL
2017 E5	PUSH HL
2018 D9	EXX
2019 CD,99,0F	CALL 3993 CALL BANK
2022 DD,E1	POP IX
2024 22,5F,5C	LD (23647), HL X POINTER
2027 2A,53,5C	LD HL, (23635) PROGRAM
2030 E3	EX (SP), HL
2031 C5	PUSH BC
2032 08	EX AF, AF'
2033 38,1B	JR C, 27 (2062) MERGE ENT-2
2035 2B	DEC HL
2036 DD,E5	PUSH IX
2038 D9	EXX
2039 21,BB,12	LD HL, 4795 INSERT BC SPACES
2042 E5	PUSH HL
2043 2E,00	LD L, 0
2045 26,FF	LD H, 255
2047 E5	PUSH HL
2048 21,00,00	LD HL, 0
2051 E5	PUSH HL
2051 E5	PUSH HL

MERGE ENT-1

2053 D9		EXX
2054 CD,99,OF		CALL 3993 CALL BANK
2057 DD,E1		POP IX
2059 23		INC HL
2060 18,17		JR 23 (2085) MERGE ENT-3
2062 DD,E5	MERGE ENT-2	PUSH IX
2064 D9		EXX
2065 21,BB,12		LD HL, 4795 INSERT BC SPACES
2068 E5		PUSH HL
2069 2E,00		LD L, 0
2071 26,FF		LD H, 255
2073 E5		PUSH HL
2074 21,00,00		LD HL, 0
2077 E5		PUSH HL
2078 E5		PUSH HL
2079 D9		EXX
2080 CD,99,OF		CALL 3993 CALL BANK
2083 DD,E1		POP IX
2085 23	MERGE ENT-3	INC HL
2086 C1		POP BC
2087 D1		POP DE
2088 ED,53,53,5C		LD (23635), DE PROGRAM
2092 ED,5B,5F,5C		LD DE, (23647) X POINTER
2096 C5		PUSH BC
2097 D5		PUSH DE
2098 EB		EX DE, HL
2099 ED,B0		LDIR
2101 E1		POP HL
2102 C1		POP BC
2103 D5		PUSH DE
2104 DD,E5		PUSH IX
2106 D9		EXX
2107 21,50,17		LD HL, 5968 DEL REC
2110 E5		PUSH HL
2111 2E,00		LD L, 0
2113 26,FF		LD H, 255
2115 E5		PUSH HL
2116 21,00,00		LD HL, 0
2119 E5		PUSH HL
2120 E5		PUSH HL
2121 D9		EXX
2122 CD,99,OF		CALL 3993 CALL BANK
2125 DD,E1		POP IX
2127 D1		POP DE
2128 C9		RET
SAVE CONTROL ROUTINE		
2129 E5	SAVE	PUSH HL
2130 3E,FD		LD A, 253 (CHAN K)
2132 DD,E5		PUSH IX
2134 D9		EXX
2135 21,30,12		LD HL, 4656 SELECT CHAN
2138 E5		PUSH HL
2139 2E,00		LD L, 0
2141 26,FF		LD H, 255

2143 E5		PUSH HL
2144 21,00,00		LD HL, 0
2147 E5		PUSH HL
2148 E5		PUSH HL
2149 D9		EXX
2150 CD,99,0F		CALL 3993 CALL BANK
2153 DD,E1		POP IX
2155 AF		XOR A CLEAR A & CARRY
2156 11,89,3C PRINT START TAPE		LD DE, 15497
2159 DD,E5		PUSH IX
2161 D9		EXX
2162 21,3F,07		LD HL, 1855 PUT MESSAGE
2165 E5		PUSH HL
2166 2E,00		LD L, 0
2168 26,FF		LD H, 255
2170 E5		PUSH HL
2171 21,00,00		LD HL, 0
2174 E5		PUSH HL
2175 E5		PUSH HL
2176 D9		EXX
2177 CD,99,0F		CALL 3993 CALL BANK
2180 DD,E1		POP IX
2182 FD,CB,02,EE		SET 5, (IY+2) CLEAR LHS ON KEYHIT
2186 CD,AA,08		CALL 2218 AKEY
2189 DD,E5		PUSH IX
2191 11,11,00		LD DE, 17
2194 AF		XOR A CLEAR A & CARRY
2195 CD,68,00		CALL 104 WRITE TAPE
2198 DD,E1		POP IX
2200 06,32		LD B, 50 (50/60 SEC BRITISH)
2202 76	WAIT 1 SEC	HALT
2203 10,FD		DJNZ, 253 (2203) WAIT 1 SEC
2205 DD,5E,0B		LD E, (IX+11) LENGTH
2208 DD,56,0C		LD D, (IX+12)
2211 3E,FF		LD A, 255 DATA CODE
2213 DD,E1		POP IX
2215 C3,68,00		JP 104 WRITE TAPE
CALL WAIT FOR A KEY ROUTINE		
2218 F5	AKEY	PUSH AF
2219 C5		PUSH BC
2220 D5		PUSH DE
2221 01,40,9C		LD BC, 40000
2224 0B	WAIT LOOP	DEC BC
2225 79		LD A, C
2226 B0		OR B BC = 0?
2227 20,FB		JR NZ, 251 (2224) WAIT LOOP
2229 AF	TRY AGAIN	XOR A CLEAR A
2230 DB,FE		IN A, (254)
2232 E6,1F		AND 31 SAVE 5 LOW BITS
2234 EE,1F		CP 31
2236 28,F7		JR Z, 247 (2229) TRY AGAIN
2238 DD,E5		PUSH IX
2240 D9		EXX
2241 21,A9,08		LD HL, 2217 CLS-LH

2244 E5	PUSH HL
2245 2E,00	LD L, 0
2247 26,FF	LD H, 255
2249 E5	PUSH HL
2250 21,00,00	LD HL, 0
2253 E5	PUSH HL
2254 E5	PUSH HL
2255 D9	EXX
2256 CD,99,0F	CALL 3993 CALL BANK
2259 DD,E1	POP IX
2261 D1	POP DE
2262 C1	POP BC
2263 F1	POP AF
2264 C9	RET

EXIT WITH ERROR ROUTINE

2265 D9	EXIT ERROR	EXX
2266 21,ED,1B		LD HL, 7149 SYN ERR
2269 E5		PUSH HL
2270 2E,00		LD L, 0
2272 26,FF		LD H, 255
2274 E5		PUSH HL
2275 D9		EXX
2276 CD,8A,0F		CALL 3978 GOTO BANK

EXTENSION INITIALIZATION ROUTINE

2279 21,EA,5E	EX INIT	LD HL, 24298 AT SYS CONF TABLE
2282 22,BC,5C		LD (23740), HL SYS CONF ADDR
2285 CD,F4,09		CALL 2548 BUILD SYS CONF TABLE
2288 2A,BC,5C		LD HL, (23740) SYS CONF TABLE
2291 11,08,00		LD DE, 8
2294 19		ADD HL, DE 8TH POSN
2295 7E		LD A, (HL)
2296 FE,01		CF 1
2298 20,13		JR NZ, 19 (2319) GET OLD CONF
2300 E5	CONF-1	PUSH HL
2301 CD,6C,09		CALL 2412 NEW INIT
2304 E1		POP HL
2305 23		INC HL
2306 5E		LD E, (HL) GET ADDR
2307 23		INC HL
2308 56		LD D, (HL)
2309 D5		PUSH DE PUSH ON STACK
2310 06,00		LD B, 0 GET BANK #
2312 23		INC HL
2313 4E		LD C, (HL)
2314 C5		PUSH BC PUSH ON STACK
2315 FB		EI
2316 CD,72,65		CALL 25970 GOTO BANK
2319 2A,BC,5C	GET OLD CONF	LD HL, (23740) SYS CONF TABLE
2322 23		INC HL
2323 7E		LD A, (HL)
2324 FE,02		CF 2
2326 28,06		JR Z, 6 (2334) CONF-2
2328 CD,6C,09		CALL 2412 NEW INIT

2331 C3,9A,09		JF 2458 FIND ADDR
2334 2B	CONF-2	DEC HL
2335 7E		LD A, (HL)
2336 FE,01		CF 1 CART PRESENT?
2338 28,32		JR Z, 50 (2390) CART INIT
2340 FE,02		CF 2
2342 20,42		JR NZ, 66 (2410) ERR R
2344 11,06,00		LD DE, 6 GET CHAN JUMP LENGTH
2347 19		ADD HL, DE
2348 4E		LD C, (HL)
2349 23		INC HL
2350 46		LD B, (HL)
2351 21,40,68		LD HL, 26688 CHAN TABLE
2354 09		ADD HL, BC
2355 EB		EX DE, HL
2356 21,40,68		LD HL, 26688 CHAN TABLE
2359 ED,80		LDIR TRANSFER NEW TABLE
2361 CD,73,09		CALL 2419 NEW INIT-2
2364 2A,BC,5C		LD HL, (23740) SYN CONF TABLE
2367 11,05,00		LD DE, 5
2370 19		ADD HL, DE NEXT CHAN DATA
2371 7E		LD A, (HL)
2372 FE,00		CF 0
2374 28,52		JR Z, 82 (2458) FIND ADDR
2376 2B		DEC HL
2377 4E		LD C, (HL) BANK #
2378 2B		DEC HL
2379 56		LD D, (HL) BANK ADDR
2380 2B		DEC HL
2381 5E		LD E, (HL)
2382 D5		PUSH DE ADDR
2383 06,00		LD B, 0
2385 C5		PUSH BC
2386 FB		EI
2387 CD,72,66		CALL 25970 GOTO BANK
2390 CD,6C,09	CART INIT	CALL 2412 NEW INIT
2393 3E,80		LD A, 128
2395 32,C6,5C		LD (23750), A BIT 7=1=CART IN
2398 21,C6,18		LD HL, 6343 AROS
2401 E5		PUSH HL
2402 06,FF		LD B, 255 BANK #
2404 0E,00		LD C, 0
2406 C5		PUSH BC
2407 CD,72,65		CALL 25790 GOTO BANK
2410 CF	ERR R	RST 8 ERROR
2411 1B		R Tape loading error
2412 21,40,68	NEW INIT	LD HL, 26688 CHAN TABLE
2415 11,15,00		LD DE, 21 CHECK LENGTH
2418 19		ADD HL, DE
2419 22,57,5C	NEW INIT-2	LD (23639), HL DATA ADDR =26709
2422 23		INC HL
2423 22,53,5C		LD (23635), HL PROGRAM = 26710
2426 22,4B,5C		LD (23627), HL VARS =26710
2429 36,80		LD (HL), 128 MARKER
2431 23		INC HL

2432	22,59,5C	LD (23641), HL E LINE= 26711
2435	36,0D	LD (HL), 13 ENTER AT E LINE
2437	23	INC HL
2438	36,80	LD (HL), 128 MARKER AT WORK SPACE
2440	23	INC HL
2441	22,61,5C	LD (23649), HL WORK SPACE=26713
2444	22,63,5C	LD (23651), HL STK BOT = 26713
2447	22,65,5C	LD (23653), HL STK END = 26713
2450	AF	XOR A CLEAR A
2451	32,C6,5C	LD (23750), A CART FLAGS =0
2454	32,C2,5C	LD (23746), A VID MODE=0
2457	C9	RET

FIND CHANNEL ADDRESS SUBROUTINE

2458	16,FF	FIND CHAN ADDR	LD D, 255 BANK #
2460	1E,80		LD E, 128 MARKER
2462	21,2F,0E		LD HL, 3631 LED 18(WAIT FOR INRPT
2465	E5		PUSH HL RET ADDR
2466	D5		PUSH DE
2467	2A,BC,5C		LD HL, (23740) SYS CONF TABLE
2470	11,0C,00		LD DE, 12 12 POSN
2473	19		ADD HL, DE
2474	06,00		LD B, 0
2476	7E	LOOP-1	LD A, (HL)
2477	FE,80		CP 128 END MARKER?
2479	28,32		JR Z, 50 (2531) CART END
2481	FE,00		CP 0 BLANK?
2483	28,28		JR Z, 49 (2525) JUMP END
2485	23		INC HL
2486	46		LD B, (HL)
2487	11,14,00		LD DE, 20
2490	19		ADD HL, DE CK 33RD (ROOM?)
2491	7E		LD A, (HL)
2492	0F		RRC A BIT 7 SET?
2493	38,05		JR C, 5 (2500) CHECK END
2495	23		INC HL
2496	23		INC HL
2497	23		INC HL
2498	18,E8		JR 232 (2476) LOOP-1
2500	23	CK END	INC HL AT 34TH POSN
2501	7E		LD A, (HL)
2502	D1		POP DE
2503	BB		CP E 128?=END?
2504	38,05		JR C, 5 (2511) GO BACK 5
2506	D5		PUSH DE
2507	23		INC HL
2508	23		INC HL
2509	18,DD		JR 221 (2476) LOOP-1
2511	D1	GO BACK 5	POP DE
2512	11,05,00		LD DE, 5
2515	ED,52		SBC HL, DE
2517	E5		PUSH HL
2518	4F		LD C, A
2519	C5		PUSH BC
2520	13		DEC DE

2521 13		DEC DE
2522 19		ADD HL, DE
2523 18,CF		JR 207 (2476) LOOP-1
2525 11,18,00	JUMP END	LD DE, 24
2528 19		ADD HL, DE
2529 18,C9		JR 201 (2476) LOOP-1
2531 C1	CART END	POP BC
2532 78		LD A, B
2533 FE,FF		CP 255
2535 28,04		JR Z, 4 (2541) CALL EXT INIT
2537 0E,59		LD C, 88
2539 18,02		JR 2 (2543) GOTO BANK
2541 0E,00	CALL EXT INIT	LD C, 0
2543 C5	GOTO BANK	PUSH BC
2545 CD,72,65		CALL 25970 GOTO BANK

BUILD SYSTEM CONFIGURATION TABLE SUBROUTINE

2548 2A,BC,5C	BUILD SYS CON TBL	LD HL (23740) SYS CONF TABLE ADR
2551 AF		XOR A CLEAR A
2552 32,BE,5C		LD (23742), A MAX BANK=0
2555 32,15,63		LD (25363), A BS MAX BANK=0
2558 11,08,00		LD DE, 8
2561 19		ADD HL, DE SETUP XFER BYTES
2562 1E,FF		LD E, 255 BANK #
2564 16,00		LD D, 0
2566 D5		PUSH DE
2567 11,01,00		LD DE, 1
2570 D5		PUSH DE
2571 E5		PUSH HL
2572 11,04,00		LD DE, 4
2575 D5		PUSH DE
2576 11,01,00		LD DE, 1
2579 D5		PUSH DE
2580 CD,22,67		CALL 26402 XFER BYTES
2583 7E		LD A, (HL)
2584 FE,01		CP 1 CART?
2586 28,22		JR Z, 34 (2622) CHECK CONF
2588 36,00		LD (HL), 0
2590 1E,FF		LD E, 255
2592 16,00		LD D, 0
2594 D5		PUSH DE
2595 11,00,80		LD DE 32768 START CHUNK 4
2598 D5		PUSH DE
2599 2A,BC,5C		LD HL, (23740) SYS CONF TABLE
2602 E5		PUSH HL
2603 11,08,00		LD DE, 8
2606 D5		PUSH DE
2607 11,01,00		LD DE, 1
2610 D5		PUSH DE
2611 CD,22,67		CALL 26402 XFER BYTES
2614 23		INC HL
2615 7E		LD A, (HL)
2616 FE,02		CP 2
2618 28,02		JR Z, 2 (2622) CHECK CONF
2620 36,00		LD (HL), 0

2622	2A,BC,5C	CHECK CONF	LD HL, (23740) SYS CONF TABLE
2625	11,0D,00		LD DE, 13
2628	19		ADD HL, DE
2629	16,C0		LD D, 192
2631	1E,00		LD E, 0
2633	CD,5C,63		CALL 25436 WRITE BS REG
2636	CD,D1,0B	CALL RES REG	CALL 3025 RES BS REG
2639	D2,D4,0A		JP NC, 2772 SET END MARKER
2642	47		LD B, A
2643	CB,F8		SET 7, B
2645	70		LD (HL), B
2646	CB,F8		RES 7, B
2648	23		INC HL
2649	DE,FE		LD C, 254 BANK #
2651	C5		PUSH BC
2652	11,E7,08		LD DE, 2279 EXT INIT
2655	D5		PUSH DE
2656	11,00,00		LD DE, 0
2659	D5		PUSH DE
2660	11,01,00		LD DE, 1
2663	D5		PUSH DE
2664	D5		PUSH DE
2665	CD,22,67		CALL 26402 XFER BYTES
2668	1E,FF		LD E, 255
2670	57		LD D, A
2671	D5		PUSH DE
2672	11,00,00		LD DE, 0
2675	D5		PUSH DE
2676	E5		PUSH HL
2677	11,16,00		LD DE, 22
2680	D5		PUSH DE
2681	11,01,00		LD DE, 1
2684	D5		PUSH DE
2685	CD,22,67		CALL 26402 XFER BYTES
2688	56		LD D, (HL)
2689	3A,E7,08		LD A, (2279) 33?
2692	BA		CP D
2693	C2,C2,0A		JP NZ, 2754 BUILD TABLE END
2696	OE,FE		LD C, 254
2698	C5		PUSH BC
2699	11,4C,0A		LD DE, 2636 CALL RES REG
2702	D5		PUSH DE
2703	11,00,00		LD DE, 0
2706	D5		PUSH DE
2707	11,01,00		LD DE, 1
2710	D5		PUSH DE
2711	D5		PUSH DE
2712	CD,22,67		CALL 26402 XFER BYTES
2715	1E,FF		LD E, 255
2717	57		LD D, A
2718	D5		PUSH DE
2719	11,00,00		LD DE, 0
2722	D5		PUSH DE
2723	E5		PUSH HL
2724	11,16,00		LD DE, 22

2727 D5		PUSH DE
2728 11,01,00		LD DE, 1
2731 D5		PUSH DE
2732 CD,22,67		CALL 26402 XFER BYTES
2735 56		LD D, (HL)
2736 3A,E7,08		LD A, (2279) 33?
2739 BA		CP D
2740 C2,C2,0A		JP NZ 2754 BUILD TABLE END
2743 2B		DEC HL
2744 2B		DEC HL
2745 CD,DB,0A		CALL 2779 INTERRUPTABLE RST
2748 11,15,00		LD DE, 21
2751 19		ADD HL, DE
2752 18,08		JR 8 (2762) CALL WR BS REG
2754 7A	BUILD TABLE END	LD A, D
2755 E6,DF		AND 223
2757 77		LD (HL), A
2758 2B		DEC HL
2759 CD,1F,0C		CALL 3103 GET USR BANK
2762 16,CO	CALL WR BS REG	LD D, 192
2764 1E,01		LD E, 1
2766 CD,5C,63		CALL 25436 WRITE BS REG
2769 C3,4C,0A		JP 2636 CALL RES REG
SET END MARKER SUBROUTINE		
2772 2B	SET END MARKER	DEC HL
2773 36,80		LD (HL), 128
2775 CD,FB,0C		CALL 3323 CLEAR SYS CONF
2778 C9		RET
INTERRUPTABLE RESTART ROUTINE		
2779 36,02	SET RST 56	LD (HL), 2
2781 C5		PUSH BC
2782 11,38,00		LD DE, 56
2785 D5		PUSH DE
2786 D5		PUSH DE
2787 11,10,00		LD DE, 16
2790 D5		PUSH DE
2791 11,01,00		LD DE, 1
2794 D5		PUSH DE
2795 CD,22,67		CALL 26402 XFER BYTES
2798 23		INC HL
2799 23		INC HL
2800 7E		LD A, (HL)
2801 CB,C7		SET O, A
2803 77		LD (HL), A
2804 11,00,00		LD DE, 0
2807 3E,01		LD A, 1
2809 08	NEXT CHUNK	EX AF, AF
2810 E5		PUSH HL
2811 EB		EX DE, HL
2812 11,00,20		LD DE, 8192 CHUNK LENGTH
2815 19		ADD HL, DE
2816 EB		EX DE, HL
2817 E1		POP HL

2818 06,FE	LD B, 254
2820 3A,BE,5C	LD A, (23742) MAX BANK
2823 4F	LD C, A
2824 C5	PUSH BC
2825 01,E7,08	LD BC, 2279 EX INIT
2828 C5	PUSH BC
2829 D5	PUSH DE
2830 01,01,00	LD BC, 1
2833 C5	PUSH BC
2834 C5	PUSH BC
2835 CD,22,67	CALL 26402 XFER BYTES
2838 3A,BE,5C	LD A, (23742) MAX BANK
2841 47	LD B, A
2842 0E,00	LD C, 0
2844 C5	PUSH BC
2845 D5	PUSH DE
2846 23	INC HL
2847 E5	PUSH HL
2848 01,01,00	LD BC, 1
2851 C5	PUSH BC
2852 C5	PUSH BC
2853 CD,22,67	CALL 26402 XFER BYTES
2856 46	LD B, (HL)
2857 2B	DEC HL
2858 3A,E7,08	LD A, (2279) 33?
2861 B8	CP B
2862 20,65	JR NZ, 101 (2965) RESET FLAGS
2864 06,FE	LD B, 254
2866 3A,BE,5C	LD A, (23742) MAX BANK
2869 4F	LD C, A
2870 C5	PUSH BC
2871 01,4C,0A	LD BC, 2636 CALL RES REG
2874 C5	PUSH BC
2875 D5	PUSH DE
2876 01,01,00	LD BC, 1
2879 C5	PUSH BC
2880 C5	PUSH BC
2881 CD,22,67	CALL 26402 XFER BYTES
2884 3A,BE,5C	LD A, (23742) MAX BANK
2887 47	LD B, A
2888 0E,00	LD C, 0
2890 C5	PUSH BC
2891 D5	PUSH DE
2892 23	INC HL
2893 E5	PUSH HL
2894 01,01,00	LD BC, 1
2897 C5	PUSH BC
2898 C5	PUSH BC
2899 CD,22,67	CALL 26402 XFER BYTES
2902 46	LD B, (HL)
2903 2B	DEC HL
2904 3A,4C,0A	LD A, (2636) 205?
2907 B8	CP B
2908 20,37	JR NZ, 55 (2965) RESET FLAGS
2910 08	EX AF, AF

SET FLAGS

2911 46		LD B, (HL)
2912 FE,01		CP 1
2914 20,04		JR NZ, 4 (2920) SET CP-2
2916 CB,C8		SET 1, B
2918 18,2A		JR 42 (2962) LD FLAG
2920 FE,02	SET CP-2	CP 2
2922 20,04		JR NZ, 4 (2928) SET CP-3
2924 CB,D0		SET 2, B
2926 18,22		JR 34 (2962) LD FLAG
2928 FE,03	SET CP-3	CP 3
2930 20,04		JR NZ, 4 (2936) SET CP-4
2932 CB,DB		SET 3, B
2934 18,1A		JR 26 (2962) LD FLAG
2936 FE,04	SET CP-4	CP 4
2938 20,04		JR NZ, 4 (2944) SET CP-5
2940 CB,E0		SET 4, B
2942 18,12		JR 18 (2962) LD FLAG
2944 FE,05	SET CP-5	CP 5
2946 20,04		JR NZ, 4 (2952) SET CP-6
2948 CB,E8		SET 5, B
2950 18,0A		JR 10 (2962) LD FLAG
2952 FE,06	SET CP-6	CP 6
2954 20,04		JR NZ, 4 (2960) SET 7
2956 CB,F0		SET 6, B
2958 18,02		JR 2 (2962) LD FLAG
2960 CB,F8	SET 7	SET 7, B
2962 70	LD FLAG	LD (HL), B
2963 18,35		JR 53 (3018) RESET END
2965 08	RESET FLAGS	EX AF, AF
2966 46		LD B, (HL)
2967 FE,01		CP 1
2969 20,04		JR NZ, 4 (2975) RESET CP-2
2971 CB,88		RES 1, B
2973 18,2A		JR 42 (3017) LD FLAG
2975 FE,02	RESET CP-2	CP 2
2977 20,04		JR NZ, (2983) RESET CP-3
2979 CB,90		RES 2, B
2981 18,22		JR 34 (3017) LD FLAG
2983 FE,03	RESET CP-3	CP 3
2985 20,04		JR NZ, 4 (2991) RESET CP-4
2987 CB,98		RES 3, B
2989 18,1A		JR 26 (3017) LD FLAG
2991 FE,04	RESET CP-4	CP 4
2993 20,04		JR NZ, 4 (2999) RESET CP-5
2995 CB,A0		RES 4, B
2997 18,12		JR 18 (3017) LD FLAG
2999 FE,05	RESET CP-5	CP 5
3001 20,04		JR NZ, 4 (3007) RESET CP-6
3003 CB,A8		RES 5, B
3005 18,0A		JR 10 (3017) LD FLAG
3007 FE,06	RESET CP-6	CP 6
3009 20,04		JR NZ, 4 (3015) RESET 7
3011 CB,B0		RES 6, B
3013 18,02		JR 2 (3017) LD FLAG
3015 CB,B8	RESET 7	RES 7, B

3017 70	LD FLAG	LD (HL), B
3018 3C	RESET END	INC A
3019 FE,08		CP 8
3021 C2,F9,0A		JR NZ, 2809 NEXT CHUNK
3024 C9		RET
RESET BS REGISTER SUBROUTINE		
3025 3A,BE,5C	RESET BS REG	LD A, (23742) MAX BANK
3028 3C		INC A
3029 32,BE,5C		LD (23742), A MAX BANK
3032 32,15,63		LD (25365), A BS MAX BANK
3035 16,A0		LD D, 160 BITS 7 & 5
3037 5F		LD E, A
3038 CD,5C,63		CALL 25436 WRITE BS REG
3041 16,80		LD D, 128
3043 5F		LD E, A
3044 CD,5C,63		CALL 25436 WRITE BS REG
3047 16,40		LD D, 64
3049 1E,00		LD E, 0
3051 CD,5C,63		CALL 25436 WRITE BS REG
3054 F5		EX AF, AF'
3055 3A,00,A0		LD A, (40960) START OF CHUNK 5
3058 08		EX AF, AF'
3059 3E,04		LD A, 4
3061 32,00,A0		LD (40960), A
3064 16,A0		LD D, 160 BITS 7 & 5
3066 1E,C0		LD E, 192
3068 CD,AD,63		CALL 25517 READ BS REG
3071 CB,53		BIT 2, E
3073 20,07		JR NZ, 7 (3082) CHUNK 5
3075 08		EX AF, AF'
3076 32,00,A0		LD (40960), A
3079 F1		POP AF
3080 37		SCF
3081 C9		RET
3082 08	CHUNK 5	EX AF, AF'
3083 32,00,00		LD (40960) START AT CHUNK 5
3086 F1		POP AF
3087 3D		DEC A
3088 32,BD,5C		LD (23742), A MAX BANK
3091 32,15,63		LD (25365), A BS MAX BANK
3094 16,C0		LD D, 192
3096 1E,04		LD E, 4
3098 CD,5C,63		CALL 25436 WRITE BS REG
3101 A7		AND A CLEAR FLAGS
3102 C9		RET
GET USR BANK SUBROUTINE		
3103 2B	GET USR BANK	DEC HL
3104 36,01		LD (HL), 1
3106 11,15,00		LD DE, 21
3109 19		ADD HL, DE
3110 7E		LD A, (HL)
3111 1F		RR A TEST BIT 0
3112 38,05		JR C, 5 (3119) EXTEND

3114	11,04,00		LD DE, 4
3117	19		ADD HL, DE
3118	C0		RET
3119	0E,08	EXTEND	LD C, 8
3121	3A,BE,5C		LD A, (23742) MAX BANK
3124	2B		DEC HL
3125	2B		DEC HL
3125	2B		DEC HL
3127	56		LD D, (HL)
3128	2B		DEC HL
3129	5E		LD E, (HL)
3130	62		LD H, D
3131	6B		LD L, E
3132	47		LD B, A
3133	E5		PUSH HL
3134	C5		PUSH BC
3135	01,00,00		LD BC, 1
3138	C5		PUSH BC
3139	C5		PUSH BC
3140	CD,D0,65		CALL 26064 CALL BANK
3143	11,08,00		LD DE, 8
3146	19		ADD HL, DE
3147	C9		RET

RESET SYSTEM CONFIGURATION SUBROUTINE

3148	AF	RESET SYS CONF	XOR A CLEAR A
3149	32,BE,5C		LD (23742), A MAX BANK = 0
3152	32,15,63		LD (25365), A BS MAX BANK = 0
3155	16,C0		LD D, 192
3157	1E,00		LD E, 0
3159	CD,5C,63		CALL 25436 WRITE BS REG
3162	2A,BC,5C		LD HL, (23740) SYS CONF TABLE
3165	11,0C,00		LD DE, 12
3168	19	RSC-1	ADD HL, DE
3169	CD,D1,0B		CALL 3025 RESET BS REG
3172	D2,F5,0C		JP NC 3317 SET END MARKER
3175	7E		LD A, (HL)
3176	E5		PUSH HL
3177	FE,80		CP 128 END MARKER?
3179	20,05		JR NZ, 5 (3186) CALL RES/BS REG
3181	11,18,00		LD DE, 24
3184	19		ADD HL, DE
3185	77		LD (HL), A
3186	CD,D1,0B	CALL RES BS REG	CALL 3025 RES BS REG
3189	21,E9,5F		LD HL, 24553 AT USR BANK TABLE
3192	1E,FF		LD E, 255
3194	57		LD D, A
3195	D5		PUSH DE
3196	11,00,00		LD DE, 0
3199	D5		PUSH DE
3200	E5		PUSH HL
3201	11,16,00		LD DE, 22
3204	D5		PUSH DE
3205	11,01,00		LD DE, 1
3208	D5		PUSH DE

3209 CD,22,67	CALL 26402 XFER BYTES
3212 08	EX AF, AF'
3213 7E	LD A, (HL)
3214 2F	CPL
3215 2B	DEC HL
3216 77	LD (HL), A
3217 08	EX AF, AF'
3218 16,FF	LD D, 255
3220 5F	LD E, A
3221 D5	PUSH DE
3222 E5	PUSH HL
3223 11,02,00	LD DE, 2
3226 D5	PUSH DE
3227 11,01,00	LD DE, 1
3230 D5	PUSH DE
3231 D5	PUSH DE
3232 CD,22,67	CALL 26402 XFER BYTES
3235 1E,FF	LD E, 255
3237 57	LD D, A
3238 D5	PUSH DE
3239 11,02,00	LD DE, 2
3242 D5	PUSH DE
3243 23	INC HL
3244 E5	PUSH HL
3245 11,01,00	LD DE, 1
3248 D5	PUSH DE
3249 D5	PUSH DE
3250 CD,22,67	CALL 26402 XFER BYTES
3253 7E	LD A, (HL)
3254 2B	DEC HL
3255 46	LD B, (HL)
3256 B8	CP B
3257 20,OF	JR NZ, 15 (3274) SKIP WR BS REG
3259 E1	POP HL
3260 7E	LD A, (HL)
3261 FE,02	CP 2
3263 20,04	JR NZ, 15 (3274) SKIP WR BS REG
3265 23	INC HL
3266 23	INC HL
3267 18,23	JR 35 (3304) WRITE BS REG
3269 CD,DB,0A	CALL 2779 SET RST 56
3272 18,1E	JR 30 (3304) WRITE BS REG
3274 4E SKIP WR BS REG	LD C, (HL)
3275 E1	POP HL
3276 23	INC HL
3277 23	INC HL
3278 7E	LD A, (HL)
3279 B9	CP C
3280 28,16	JR Z, 22 (3304) WR BS REG
3282 E5	PUSH HL
3283 EB	EX DE, HL
3284 21,E9,5F	LD HL, 23553 USR BANK TABLE
3287 01,16,00	LD BC, 22
3290 ED,B0	LDIR
3292 E1	POP HL

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3293 2B          DEC HL
3294 3A,BE,5C    LD A, (23742) MAX BANK
3297 CB,FF       SET 7, A
3299 77          LD (HL), A
3300 CD,1F,0C    CALL 3103 GET USR BANK
3303 23          INC HL
3304 16,C0      WRITE BS REG    LD D, 192
3306 1E,01      LD E, 1
3308 CD,5C,63    CALL 25436 WRITE BS REG
3311 11,16,00    LD DE, 22
3314 C6,60,0C    JP 3168 GET USR BANK

SET END MARKER SUBROUTINE
3317 36,80      SET END MARKER LD (HL), 128
3319 CD,FB,0C    CALL 3323 CLEAR SYS CONF
3322 C9          RET

CLEAR SYSTEM CONFIGURATION SUBROUTINE
3323 AF          CLEAR SYS CONF XOR A CLEAR A
3324 32,BE,5C    LD (23742), A MAX BANK = 0
3327 2A,BC,5C    GET SYS CONF TABLE LD HL, (23740) SYS CONF TABLE
3330 11,0C,00    LD DE, 12
3333 19          ADD HL, DE
3334 7E          CLEAR DOCK SYS LOOP LD A, (HL)
3335 FE,80      CP 128 END MARKER?
3337 28,79      JR Z, 121 (3460) CLEAR MAX BANK
3339 23          INC HL
3340 7E          LD A, (HL)
3341 CB,7F      BIT 7, A
3343 20,06      JR NZ, 6 (3351) USR SYS-1
3345 11,17,00    LD DE, 23
3348 19          ADD HL, DE
3349 18,EF      JR 239 (3334) CL DOCK SYS LOOP
3351 22,E9,5F    USR SYS-1      LD (24553), HL USR BANK ADDR 1
3354 2B          DEC HL
3355 7E          LD A, (HL)
3356 FE,02      CP 2
3358 20,08      JR NZ, 8 (3368) USR SYS-2
3360 11,17,00    LD DE, 23
3363 19          ADD HL, DE
3364 3E,FF      LD A, 255
3366 18,05      JR 5 (3373) USR SYS-3
3368 11,17,00    USR SYS-2      LD DE, 23
3371 19          ADD HL, DE
3372 7E          LD A, (HL)
3373 32,EB,5F    USR SYS-3      LD (24555), A USR BANK ADDR 2
3376 23          USR SYS LOOP  INC HL
3377 7E          LD A, (HL)
3378 FE,80      CP 128
3380 28,2E      JR Z, 46 (3428) INCREASE BANKS
3382 23          INC HL
3383 7E          LD A, (HL)
3384 CB,7F      BIT 7, A
3386 20,06      JR NZ, 6 (3394) USR SYS L-1
3388 11,17,00    LD DE, 23

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3391 19		ADD HL, DE
3392 18,EE		JR 238 (3376) USR SYS LOOP
3394 2B	USR SYS L-1	DEC HL
3395 7E		LD A, (HL)
3396 FE,02		CP 2
3398 20,06		JR NZ, 6 (3406) USR SYS L-2
3400 11,17,00		LD DE, 23
3403 19		ADD HL, DE
3404 18,E2		JR 226 (3376) USR SYS LOOP
3406 EB	USR SYS L-2	EX DE, HL
3407 01,17,00		LD BC, 23
3410 09		ADD HL, BC
3411 3A,EB,5F		LD A, (24555) USR BANK ADDR 2-LOW
3414 47		LD B, A
3415 7E		LD A, (HL)
3416 B8		CP B
3417 30,D5		JR NC, 213 (3376) USR SYS LOOP
3419 32,EB,5F		LD (24555), A RELOAD ADDR LOW
3422 ED,53,E9,5F		LD (24553), DE
3426 18,CC		JR 204 (3376) USR SYS LOOP

INCREASE BANKS SUBROUTINE

3428 3A,BE,5C	INCREASE BANKS	LD A, (23742) MAX BANK
3431 3D		INC A
3432 3A,BE,5C		LD (23742), A MAX BANK
3435 2A,E9,5C		LD HL, (23553) USR SYS BANK ADDR
3438 77		LD (HL), A
3439 1E,FF		LD E, 255
3441 57		LD D, A
3442 D5		PUSH DE
3443 5E		LD E, (HL)
3444 16,00		LD D, 0
3446 D5		PUSH DE
3447 1E,00		LD E, 0
3449 D5		PUSH DE
3450 1E,01		LD E, 1
3452 D5		PUSH DE
3453 D5		PUSH DE
3454 CD,22,67		CALL 26402 XFER BYTES
3457 C3,FF,0C		JP 3327 GET SYS CONF TABLE ADDR

CLEAR MAX BANKS SUBROUTINE

3460 AF	CLEAR MAX BANK	XOR A CLEAR A
3461 32,BE,5C		LD (23742), A MAX BANK = 0
3464 32,15,63		LD (25365), A BS MAX BANK = 0
3467 16,C0		LD D, 192
3469 1E,00		LD E, 0
3471 CD,5C,63		CALL 25436 WRITE BS BANK
3474 2A,BC,5C		LD HL, (23740) SYS CONF TABLE
3477 11,0D,00		LD DE, 13
3480 19		ADD HL, DE
3481 16,A0		LD D, 160
3483 CD,D1,0B	CALL RESET BS REG	CALL 3025 RES BS REG
3486 D0		RET NC
3487 5E		LD E, (HL)

3488 CD,5C,63
 3491 16,C0
 3493 1E,01
 3495 CD,5C,63
 3498 11,18,00
 3501 19
 3502 18,EB

CALL 25436 WRITE BS REG
 LD D, 160
 LD E, 1
 CALL 25436 WRITE BS REG
 LD DE, 24
 ADD HL, DE
 JR 235 (3483) CALL RESET BS REG

CHANGE VIDEO MODE ROUTINES

OPEN DISPLAY FILE ROUTINE

3504 C5 OPEN D FILE

3505 D5

3506 E5

3507 F5

3508 2A,B4,5C

3511 ED,5B,7B,5C

3515 A7

3516 ED,52

3518 44

3519 4D

3520 03

3521 2A,7B,5C

3524 E5

3525 11,40,08

3528 A7

3529 ED,52

3531 EB

3532 E1

3533 ED,53,7B,5C

3537 ED,B0

XFER UDG

3539 21,00,00

3542 39

3543 01,C0,97

3546 09

3547 F3

3548 F9

3549 11,C0,F7

3552 21,00,60

3555 01,40,08

3558 ED,B0

XFER DISPATCHER

3560 21,00,1D

3563 01,C0,97

3566 5E

FIX BL LOOP

3567 23

3568 56

3569 23

3570 7B

3571 B2

3572 28,OF

3574 EB

3575 09

3576 D5

3577 5E

3578 23

3579 56

PUSH BC

PUSH DE

PUSH HL

PUSH AF

LD HL, (23732) P RAMTOP

LD DE, (23675) UDG

AND A CLEAR FLAGS

SBC HL, DE

LD B, H

LD C, L

INC BC

LD HL, (23675) UDG

PUSH HL

LD DE, 2112 MAKE THIS MUCH SPACE

AND A CLEAR FLAGS

SBC HL, DE

EX DE, HL

POP HL

LD (23675), DE UDG

LDIR

LD HL, 0

ADD HL, SP

LD BC, 38848 AMOUNT OF SHIFT

ADD HL, DE

DI NO INTERRUPTS PLEASE

LD SP, HL

LD DE, 63427

LD HL, 24576

LD BC, 2112

LDIR

LD HL, 7424 ADDR OF FIX BL TABLE

LD BC, 38848 AMT OF SHIFT

LD E, (HL) GET ADDR TO BE FIXED

INC HL

LD D, (HL)

INC HL

LD A, E IF ZERO, DONE

OR D DE = 0?

JR Z, 15 (3589) FIX BL DONE

EX DE, HL

ADD HL, BC ADD SHIFT

PUSH DE

LD E, (HL) CALC NEW ADDR

INC HL

LD D, (HL)

3580 EB		EX DE, HL
3581 09		ADD HL, BC
3582 EB		EX DE, HL
3583 72		LD (HL), D POKE NEW ADDR
3584 2B		DEC HL
3585 73		LD (HL), E
3586 E1		POP HL
3587 18,E9		JR 233 (3366) FIX BL LOOP
3589 F1	FIX BL DONE	POP AF
4590 32,C2,5C		LD (23746), A VID MODE
3593 F5		PUSH AF
3594 FB		EI
3595 21,00,60	CLEAR D FILE 2	LD HL, 24576 D-FILE 2
3598 AF	CL D F LOOP	XOR A CLEAR A
3599 77		LD (HL), A
3600 23		INC HL
3601 7C		LD A, H
3602 FE,7B		CP 123 H AT END?
3604 20,F8		JR NZ, 248 (3598) CL D F LOOP
3606 F1		POP AF
3607 F5		PUSH AF
3608 E6,7F		AND 127 CLEAR BIT 7
3610 47		LD B, A
3611 DB,FF		IN A, (255)
3613 E6,80		AND 128 SAVE BIT 7
3615 B0		OR B
3616 D3,FF		OUT (255), A
3618 E1		POP HL
3619 D1		POP DE
3620 C1		POP BC
3621 F1		POP AF
3622 C9		RET
CLOSE DISPLAY FILE ROUTINE		
3623 F5	CLOSE D FILE	PUSH AF SAVE REGISTERS
3624 C5		PUSH BC
3625 D5		PUSH DE
3626 E5		PUSH HL
3627 DB,FF		IN A, (255)
3629 E6,80		AND 128
3631 D3,FF		OUT (255), A
3633 21,00,00		LD HL, 0
3636 39		ADD HL, SP
3637 11,C0,97		LD DE, 38848 AMT OF CHANGE
3640 A7		AND A CLEAR FLAGS
3641 ED,52		SBC HL, DE
3643 F3		DI
3644 F9		LD SP, HL
3645 21,FF,FF		LD HL, 65535 P RAMTOP
3648 11,3F,68		LD DE, 26687 TOP DEST ADDR
3651 01,40,08		LD BC, 2112
3654 ED,B8	XFER DISPATCHER	LDDR
3656 21,00,1D		LD HL, 7424 FIX BL TABLE
3659 0C,C0,97		LD BC, 38848
3662 5E	FIX BL LOOP	LD E, (HL)

3663 23		INC HL
3664 56		LD D, (HL)
3665 23		INC HL
3666 7B		LD A, E
3667 B2		OR D DE =0 ? TABLE END?
3668 28,10		JR Z, 16 (3686) XFER UDG
3670 E5		PUSH HL
3671 EB		EX DE, HL
3672 5E		LD E, (HL)
3673 23		INC HL
3674 56		LD D, (HL)
3675 EB		EX DE, HL
3676 A7		AND A CLEAR FLAGS
3677 ED,42		SBC HL, DE
3679 EB		EX DE, HL
3680 72		LD (HL), D
3681 2B		DEC HL
3682 73		LD (HL), E
3683 E1		POP HL
3684 18,E8		JR 232 (3662) FIX BL LOOP
3686 AF	XFER UDG	XOR A CLEAR A
3687 32,C2,5C		LD (23746), A VID MODE = 0
3690 FB		EI
3691 21,BF,F7		LD HL, 63423
3694 11,FF,FF		LD DE, 65535
3697 E5		PUSH HL
3698 ED,4B,7B,5C		LD BC, (23675) UDG ADDR
3703 ED,42		SBC HL, BC
3705 44		LD B, H
3706 4D		LD C, L
3707 03		INC BC
3708 E1		POP HL
3709 ED,B8		LDDR
3711 11,40,08		LD DE, 2112
3714 2A,7B,5C		LD HL, (23675) RESET UDG
3717 19		ADD HL, DE
3718 22,7B,5C		LD (23675), HL
3721 E1		POP HL
3722 D1		POP DE
3723 C1		POP BC
3724 F1		POP AF
3725 C9		RET
CHANGE VIDEO MODE ROUTINE		
3726 C5	CHANGE VIDEO	PUSH BC
3727 D5		PUSH DE
3728 E5		PUSH HL
3729 F5		PUSH AF
3730 47		LD B, A
3731 3A,C2,6C		LD A, (23746) VID MODE
3734 A7		AND A CLEAR FLAGS
3735 20,54		JR NZ, 84 (3821) MODE 0
3737 B0		OR B
3738 CA,3D,0F		JP Z, 3901 CHANGE VIDEO END
3741 21,C0,12		LD HL, 4800

3744 44		LD B, H
3745 4D		LD C, L
3746 11,40,08		LD DE, 2112
3749 19		ADD HL, DE HL= 6912 (SPACE)
3750 ED,5B,65,5C		LD DE, (23653) STK END
3754 19		ADD HL, DE
3755 ED,5B,B2,5C		LD DE, (23730) RAM TOP
3759 A7		AND A CLEAR FLAGS
3760 ED,52		SBC HL, DE
3762 D2,3A,0F		JP NC, 3898 CV ABORT
3765 21,3F,68		LD HL, 26687
3768 11,CA,12		LD DE, 4810 REMGSZ(POINTERS)
3771 D5		PUSH DE
3772 11,00,FF		LD DE, 255 (BANK)
3775 D5		PUSH DE
3776 11,00,00		LD DE, 0
3779 D5		PUSH DE
3780 D5		PUSH DE
3781 CD,D0,65		CALL 26064 CALL BANK
3784 2A,65,5C	LD UP PROG	LD HL, (23653) STK BOTTOM
3787 EB		EX DE, HL
3788 ED,B8		LDDR
3790 F1		POP AF
3791 F5		PUSH AF
3792 CD,B0,0D		CALL 3504 OPEN D-FILE
3795 01,C0,97		LD BC, 38848 SHIFT AMT
3798 2A,3D,5C	UPDATE POINTERS	LD HL, (23613) ERR SP
3801 09		ADD HL, BC
3802 22,3D,5C		LD (23613), HL ERR SP
3805 2A,3F,5C		LD HL, (23615) LIST SP
3808 09		ADD HL, BC
3809 22,3F,5C		LD (23615), HL LIST SP
3812 2A,C0,5C		LD (23744), HL MACH STK BOT
3815 09		ADD HL, BC
3816 22,C0,5C		LD (23744), HL
3819 18,50		JR 80 (3901) CV END
3821 78	MODE 0	LD A, B
3822 A7		AND A CLEAR FLAGS
3823 28,10		JR Z, 16 (3841) MODE 0-2
3825 E6,7F		AND 127
3827 47		LD B, A
3828 DB,FF		IN A, (255)
3830 E6,80		AND 128
3832 B0		OR B
3833 D3,FF		OUT (255), A
3835 78		LD A, B
3836 32,C2,5C		LD (23746), A VID MODE
3839 18,3C		JR 60 (3901) CV END
3841 CD,27,0E	MODE 0-2	CALL 3623 CLOSE D-FILE
3844 01,C0,97		LD BC, 38848 UPDATE POINTERS
3847 2A,3D,5C		LD HL, (23613) ERR SP
3850 A7		AND A CLEAR FLAGS
3851 ED,42		SBC HL, DE
3853 22,3D,5C		LD (23613), HL
3856 2A,3F,5C		LD HL, (23615) LIST SP

3859 A7		AND A CLEAR FLAGS
2560 ED, 42		SBC HL, DE
2862 22, 3F, 5C		LD (23615), HL LIST SP
2865 2A, C0, 5C		LD HL, (23744) MACH STK BOT
2868 A7		AND A CLEAR FLAGS
2869 ED, 42		SBC HL, BC
2871 22, C0, 5C		LD (23744), HL MACH STK BOT
2874 01, C0, 12		LD BC, 4800
2877 21, 40, 68		LD HL, 26688
3880 11, 50, 17		LD DE, 5968 DEL REC
3883 D5		PUSH DE
3884 11, 00, FF		LD DE, D=255 (BANK #)
3887 D5		PUSH DE
3888 11, 00, 00		LD DE, 0
3891 D5		PUSH DE
3892 D5		PUSH DE
3893 CD, D0, 65		CALL 26064 CALL BANK
3896 18, 03		JR 3 (3901) CV END
3898 37	CV ABORT	SCF
3899 18, 01		JR 1 (3902) GET REGISTERS
3901 A7	CV END	AND A CLEAR FLAGS
3902 F2	GET REGISTERS	POP AF
3903 E1		POP HL
3904 D1		POP DE
3905 C1		POP BC
3906 C9		RET

PASSING ROUTINE

3907 ED, 4B, 5D, 5C	PASSING	LD BC, (23645) CHAR ADDR
3911 CD, 5D(5E), 25	!!ERROR!!	CALL 9565 (9566) CALL END?
		NOT FATAL-WILL STILL WORK
3914 2A, 5D, 5C		LD HL, (23645) CHAR ADDR
3917 A7		AND A CLEAR FLAGS
3918 ED, 42		SBC HL, BC
3920 2B		DEC HL
3921 7D		LD A, L
3922 2A, 65, 5C		LD HL, (23653) SKT END
3925 77		LD (HL), A PUT # ON STACK
3926 23		INC HL
3927 C1		POP BC
3928 70		LD (HL), B
3929 23		INC HL
3930 71		LD (HL), C
3931 23		INC HL
3932 22, 65, 5C		LD (23653), HL STK END
3935 2A, 5D, 5C		LD HL, (23645) CHAR ADDR
3938 2B		DEC HL
3939 CB, 47		BIT 0, A
3941 28, 0C		JR Z, 12 (3953) PASS-2
3943 3D	PASS LOOP	DEC A
3944 46		LD B, (HL)
3945 2B		DEC HL
3946 3D		DEC A
3947 FA, 7D, 0F		JP N, 3965 GET GOSUB ADDR
3950 4E		LD C, (HL)

3951 2B		DEC HL
3952 C5		PUSH BC
3953 18,F4		JR 244 (3943) PASS LOOP
3955 06,20	PASS-2	LD B, 22
3957 A7		AND A CLEAR FLAGS
3958 C8		RET Z
3959 4E		LD C, (HL)
3960 2B		DEC HL
3961 3D		DEC A
3962 C5		PUSH BC
3963 18,EA		JR 234 (3943) PASS LOOP

PASSING SET GOSUB ADDRESS SUBROUTINE

3965 2A,65,5C GET GOSUB ADDR	LD HL, (23653) STK END
3968 2B	DEC HL
3969 7E	LD A, (HL)
3970 2B	DEC HL
3971 22,65,5C	LD (23653), HL STK END
3974 66	LD H, (HL)
3975 6F	LD L, A
3976 E5	PUSH HL
3977 C9	RET (TO PUSHED HL)

GOTO BANK ROUTINE

3978 F5	GOTO BANK	PUSH AF
3979 3A,C2,5C		LD A, (23746) VID MODE
3982 A7		AND A CLEAR FLAGS
3983 28,04		JR Z, 4 (3989) MODE 0
3985 F1		POP AF
3986 C3,72,65		JP 64818 GOTO BANK HIGH
3989 F1	MODE 0	POP AF
3990 C3,72,65		JP 25970 GOTO BANK

CALL BANK ROUTINE

3993 F5	CALL BANK	PUSH AF
3994 3A,C2,5C		LD A, (23746) VID MODE
3997 A7		AND A CLEAR FLAGS
3998 28,04		JR Z, 4 (4004) MODE 0
4000 F1		POP AF
4001 C3,90,FD		JP 64912 CALL BANK HIGH
4004 F1	MODE 0	POP AF
4005 C3,D0,65		JP 26064 CALL BANK

4008-4095 BLANK

4096-5662 FUNCTION DISPATCHER (SEE 25088 TRANSFERRED POSN)

5663-7423 BLANK

FIX BL TABLE

7424 32,62	(25137)
7426 4D,62	(25165)
7428 72,62	(25202)
7430 AB,62	(25259)
7432 B8,62	(25272)

ADDRESSES TO BE CHANGED AS THE
FUNCTION DISPATCHER IS RELOCATED
OFFSET IS ALWAYS 38848 UP OR DOWN

7434	CD, 62	(25293)	
7436	D3, 62	(25299)	
7438	DC, 62	(25308)	
7440	FB, 62	(25339)	
7442	1A, 63	(25370)	
7444	20, 63	(25376)	
7446	24, 63	(25380)	
7448	2A, 63	(25386)	
7450	35, 63	(25397)	
7452	3E, 63	(25406)	
7454	44, 63	(25412)	
7456	48, 63	(25416)	
7458	4E, 63	(25422)	
7460	57, 63	(25431)	
7462	17, 64	(25623)	
7464	1E, 64	(25629)	
7466	28, 64	(25640)	
7468	61, 64	(25697)	
7470	65, 64	(25701)	
7472	6D, 64	(25709)	
7474	9F, 64	(25759)	
7476	AC, 64	(25769)	
7478	B3, 64	(25779)	
7480	OE(OF), 65	(25870)	!!ERROR!! SHOULD BE 25871!
7482	16(17), 65	(25878)	!!ERROR!! SHOULD BE 25879!
7484	32, 65	(25906)	THESE ERRORS NOT FATAL UNDER PRESENT USE AS THE ROUTINE THEY ARE IN IS NOT USED BUT ARE FATAL WITH FULLY FUNCTIONAL DISPATCHER. THEY ALSO RECUR WITH EVERY TRANSFER UP OR DOWN.
7486	3A, 65	(25914)	
7488	5C, 65	(25948)	
7490	66, 65	(25958)	
7492	CE, 65	(26062)	
7494	85, 65	(25989)	
7496	D3, 65	(26067)	
7498	ED, 65	(26093)	
7500	F9, 65	(26105)	
7502	1E, 66	(26142)	
7504	2D, 66	(26157)	
7506	3A, 66	(26170)	
7508	42, 66	(26178)	
7510	50, 60	(26192)	
7512	66, 66	(26214)	
7514	72, 66	(26226)	
7516	80, 66	(26240)	
7518	94, 66	(26260)	
7520	CO, 66	(26304)	
7522	FD, 66	(26365)	
7524	03, 67	(26371)	
7526	30, 67	(26416)	
7528	4F, 67	(26447)	!!ERROR!! SHOULD BE DELETED AND ALL THE REST MOVED UP. JUST PUTTING IN 00,00 WILL NOT DO AS THE ROUTINES USING THIS TABLE WILL ASSUME THE TABLE HAS ENDED.
7530	50, 67	(26448)	
7532	5A, 67	(26458)	
7534	76, 67	(26486)	
7536	7D, 67	(26493)	
7538	A7, 67	(26535)	
7540	DC, 67	(26588)	
7542	E3, 67	(26595)	

7544 F6,67 (26614)
 7546 00,00 END MARKER

7548-7899 UNUSED

FUNCTION DISPATCHER JUMP TABLE

7900 95,17 PUT LINE WORKS FROM CODE 146 DOWN,
 7902 13,28 DRAW LINE
 7904 24,26 FIND POINT
 7906 39,09 SCROLL
 7908 A6,08 K-CLS
 7910 3F,07 PUT MESSAGE
 7912 66,05 PUT NEW LINE
 7914 54,05 PUT CUR RIGHT
 7916 3A,05 PUT CUR LEFT
 7918 B0,02 UPD-KEYBOARD
 7920 10,00 WRITE CHAR
 7922 ED,11 SEND CHAR
 7924 CF,11 READ CHAR
 7926 6C,3C TO THE
 7928 65,3C SQR
 7930 5E,3C ACS
 7932 4E,3C ASN
 7934 FD,3B ATN
 7936 F5,3B TAN
 7938 D0,3B SIN
 7940 C5,3B COS
 7942 9E,3B GET ARGUMENT
 7944 2E,3B LN
 7946 DF,3A EXP
 7948 CA,3A INT
 7950 BB,3A IND DIV(N MOD M)
 7952 56,36 E TO FP
 7954 D3,35 TRUNCATE
 7956 6E,35 DIVIDE
 7958 89,34 TIMES
 7960 68,34 MULTIPLY
 7962 D3,33 ADD
 7964 CE,33 SUBTRACT
 7966 A1,31 OUTPUT #
 7968 93,31 FP TO A
 7970 60,31 FP TO BC
 7972 F9,30 INT TO FP
 7974 E9,30 STK BC
 7976 E6,30 STK A
 7978 57,30 STK UNSIGNED #
 7980 C0,2F DIM
 7982 AF,2F POP STRING
 7984 BD,2E LET
 7986 74,2E PUT AEDCB
 7988 70,2E PUSH STRING
 7990 70,2C FIND N (VARIABLE)
 7992 F2,29 FIND INKEY\$
 7994 E5,29 FIND PI
 7996 B6(BC),29 RND !!ERROR!! CORRECT AS SHOWN

```
7998 D7,28  FIND ATTR
8000 8E,28  FIND SCREEN#
8002 54,28  EXPRESSION
8004 10,28  DRAW LINE
8006 DB,26  DRAW
8008 79,26  CIRCLE
8010 60,26  GET X,Y
8012 3E,26  PLOT BC
8014 35,26  PLOT
8016 03,26  SCRMBL(CALC SCREEN ADDR)
8018 1D,24  HIFLASH
8020 DE,23  COLOR
8022 80,23  CHAN = KB?
8024 6B,22  INPUT SEQ
8026 2B,22  INPUT
8028 7E,21  PRINT SEQ
8030 59,21  PRINT
8032 55,21  LPRINT
8034 1D,20  DEF FN
8036 09,20  BREAK?
8038 EB,1F  PAUSE
8040 D4,1F  RETURN
8042 BB,1F  CK SZ
8044 99,1F  GOSUB
8046 39,1F  CLEAR BC
8048 36,1F  CLEAR
8050 23,1F  FIX U (GET INT)
8052 1E,1F  FIX U1(GET SINGLE INT)
8054 1F,1E  JUMP(GOTO)
8056 E4,1E  CONTINUE
8058 D4,1E  RANDOMIZE
8060 CA,1E  RESTORE
8062 82,1E  DATA
8064 97,1D  READ
8066 55,1D  NEXT
8068 59,1C  STOP
8070 78,1C  FOR
8072 D8,1A  EXECUTE LINE
8074 27,1A  CHECK SYNTAX
8076 88,17  PUT BC (PUT LINE IS 95,17)
8078 50,17  DELETE RECORD
8080 20,17  RECORD LENGTH
8082 F0,16  FIND SUB LINE
8084 D6,16  FIND LINE
8086 0D,16  FLASH A
8088 D0,25  MOVE
8090 CC,25  FORMAT
8092 D4,25  ERASE
8094 C8,25  CATALOG
8096 65,14  OPEN CHAN
8098 2A,14  OPEN
8100 BE,13  CLOSE CHAN
8102 9F,13  CLOSE
8104 54,13  RESET CALC STACK
8106 BB,12  INSERT
```

8108 30,12 SELECT CHAN
8110 E1,11 IN CHAR
8112 31,0D INITIALIZE
8114 1D,0D NEW
8116 0D,0D DESLUG
8118 4A,0A PRINTER SCAN
8120 23,0A DUMP (TO) PRINTER
8122 EA,08 CLS
8124 A9,08 CLS-LH
8126 88,08 READ ATTR
8128 10,07 ATTR BYTE
8130 B2,05 SET AT
8132 00,05 SEND TV
8134 02,0A K DUMP(COPY)
8136 36,04 BEEP
8138 FE,03 PAR P (SOUND)
8140 E1,02 UPD-KEYBOARD
8142 FF,FF
8144 FF,FF
8146 FF,FF
8148 FF,FF
8150 FF,FF
8152 21,67 XFER BANK (6722)
8154 CF,65 CALL BANK (67D0)
8156 71,65 GOTO BANK (6772)
8158 99,64 BANK ENABLE
8160 5E,64 GET BANK #
8162 05,64 GET STATUS
8164 FF,FF
8166 FF,FF
8168 FF,FF
8170 FF,FF
8172 E5,00 WRITE BORDER
8174 A3(8E),0E CHANGE VIDEO IS 0E8E
8176 51,08 SAVE
8178 E5,06 MERGE
8180 CC,05 LOAD
8182 AB,01 SLVM
8184 8D,01 READ EDGE
8186 89,01 READ BIT
8188 FC,00 READ TAPE
8190 68,00 WRITE TAPE

END OF EROM

ERROR LIST

ADDR	ROUTINE	
109 28	NONMASKABLE INTERRUPT	CORRECTS DELETE PRINT
1256-1279	PROGRAM NAME	UNUSED
9663 CD,09,0F???	PASS EM	CALL TO 3849??
9700-9728	GARBAGE	UNUSED
13759 E1	DIVIDE	WRONG JUMP CAUSES CERTAIN NUMBERS NOT TO BE ROUNDED
13796-13822	TRUNCATE	CAN BE DELETED AS IS UNNECCARY CHECK OF -65536
25408 D5	PUT WORD	NEEDS REWRITE
25424-25429 C1,D1,73,72,2B		
25611 24	GET STATUS	NEEDS REWRITE
25615 37		
25618 27		
25648 0E,FF		
25650 DB,FF		
25652 E6,80		
25654 28,12		
25656 18,08		
25658 0E,FF		
25660 DB,FF		
25662 E6,80		
25664 20,08		
25666 DB,F4		
25668 2F		
25669 18,02		
25671 DB,F4		
25673 4F		
25753 00	BANK ENABLE	SHOULD HAVE DISABLE INTERRUPT ON
25757 F3		
25884 FB		
25930 F3	RESTORE STATUS	SHOULD HAVE DISABLE INTERRUPT
25968 FB		
26128 09	CALL BANK	SHOULD GET NEXT PARAMETER
26474 5F	XFER BYTES	WRONG REGISTER LOADED
E3912 5E	PASSING	WRONG CALL ADDR BUT WILL STILL WORK
E7480 0F	FIX BL TABLE	WRONG ADDRESSES
E7482 17		
E7528	DELETE AND MOVE REST OF TABLE UP	
E7996 BC	JUMP TABLE	RND WRONG ADDR

FLAGS LISTING

	IF ON	IF OFF
23611	FLAGS	
	7 NEED INTERRUPT	CHECK SYNTAX
	6 NUMBER	STRING
	5 KEYHIT	NO KEYHIT
	4 TOKEN/SLUG	REG CHARACTER
	3 L MODE AT CURSOR	K MODE AT CURSOR
	2 L MODE AT CHAR	K MODE AT CHAR
	1 TO PRINTER	TO SCREEN
	0 SUPPRESS SPACE	DONT SUPPRESS SPACE
23612	TV FLAGS	
	7 AND 6 NOT USED	
	5 CLEAR SCREEN WHEN KEY PRESSED	
	4 AUTO LIST	
	3 ECHO INPUT FROM KEYBOARD	
	2	
	1 OUTPUT LINE FOR EDIT OR # FOR STRING	
	0 USE LOWER SCREEN	USE UPPER SCREEN
23665	FLAG X	
	7 LINE INPUT	STRING LINE
	6 NEED NUMBER	
	5 NEED INPUT	PROGRAM LINE
	4-3-2	NOT USED
	1 VARIABLE NOT FOUND	VARIABLE FOUND
	0 FLEXIBLE LENGTH NEEDED	
23697	P FLAG	
	7 PAPER COMPLIMENT OF INK PERM	
	6 PAPER COMPLIMENT OF INK TEMP	
	5 INK COMPLIMENT OF PAPER PERM	
	4 INK COMPLIMENT OF PAPER TEMP	
	3 INVERT(INV) PERM	
	2 INVERT(INV) TEMP	
	1 OVER (XOR) PERM	
	0 OVER (XOR) TEMP	
23658	FLAGS 2	
	6-7 NOT USED	
	5 DELETE KEY REPEAT	
	4 RETYPE POSSIBLE AFTER SYNTAX ERROR	
	3 CAPS LOCK ON	
	2 INSIDE STRING WHEN DONG KEYBOARD LIST CHAR	
	1 PRINTER BUFFER NOT EMPTY	
	0 AUTOMATIC LISTING ON SCREEN	
23617	MODE	
	1 G MODE	
	0 E MODE	K OR L MODE
AROS		
23748/9	POINTER BUFFER	
23750	FLAG 7 PRESENT 4 NEXT LINE 3 DATA LINE 1 SCREEN	
23751/2	CURRENT DATA LINE	
23753/4	LEN CURRENT DATA LINE	
23755	STREAM #	

INDEX TO ROUTINES LISTING SPECTRUM EQUIVALENTS

PAGE	ROUTINE	2048 ADDR	SPECTRUM
RESTART ROUTINES AND TABLES			
1	START(PLUGIN)	0000/0000	0000/0000
1	ERROR RESTART	0008/0008	0008/0008
1	PRINT (WRITE CH) RESTART	0016/0010	0016/0010
1	GET CHAR RESTART	0024/0018	0024/0018
1	NEXT CHAR RESTART	0032/0020	0032/0020
1	CALCULATE FLOATING POINT	0040/0028	0040/0028
1	MAKE BC SPACES RESTART	0048/0030	0048/0030
1	MASKABLE INTERRUPT RST	0056/0038	0056/0038
2	ERROR-2	0083/0053	0083/0053
2	NON MASKABLE INTERRUPT	0102/0066	0102/0066
2	CHARACTER ADDRESS +1	0116/0074	0116/0074
2	SKIP OVER	0125/007D	0125/007D
2	TOKEN SPELL TABLE	0152/0098	0149/0095
4	KEY TABLES	0551/0227	0517/0205
KEYBOARD ROUTINES			
5	KEYBOARD SCAN	0688/02B0	0654/028E
6	UPDATE KEYBOARD	0737/02E1	0703/02BF
7	REPEATING KEY	0822/0336	0784/0310
7	TEST KEYBOARD MODE	0860/035C	0798/031E
SPEAKER ROUTINES			
9	SOUND(PAR P)	1011/03F3	0949/03B5
10	BEEP	1078/0436	1016/03F8
11	SEMITONE TABLE(NOTES)	1196/04AC	1134/046E
11	PROGRAM NAME(NOT USED)	1256/04E8	1194/04AA
SCREEN AND PRINTER HANDLING ROUTINES			
12	SEND TV	1280/0500	2548/09F4
12	CONTROL CHARACTER TABLE	1320/0528	2577/0A11
13	CURSOR LEFT	1338/053A	2595/0A23
13	CURSOR RIGHT	1364/0554	2621/0A3D
13	NEWLINE	1382/0566	2639/0A4F
13	PRINT COMMA	1398/0576	2655/0A5F
13	PRINT "?"	1408/0580	2665/0A69
13	CONTROL CHAR W OPERANDS	1412/0584	2669/0A6D
14	PRINTABLE CHAR CODES	1520/05F0	2777/0AD9
14	POSITION STORE	1523/05F3	2780/0ADC
15	GET POSITION	1562/061A	2819/0B03
15	PRINT ANY CHARACTER	1595/063B	2852/0B24
16	PRINT ALL CHARACTERS	1716/06B4	2943/0B7F
17	SET ATTR BYTE	1808/0710	3035/0BDB
18	MESSAGE PRINTING	1855/073F	3082/0C0A
18	PRINTOUT SAVE	1910/0776	3131/0C3B
18	TABLE SEARCH	1916/077C	3137/0C41
19	TEST FOR SCROLL	1936/0790	3157/0C55
20	SCROLL MESSAGE	2099/0833	3320/0CF8
20	SCROLL LOWER SCREEN	2109/083D	3330/0D02
21	TEMPORARY COLOR ITEMS	2184/0888	3405/0D4D
21	CLS COMMAND	2214/08A6	3435/0D6B

22	CLEAR FULL SCREEN	2282/08EA	3503/0D6B
22	CLEAR SET	2324/0914	3545/0DD9
23	SCROLLING	2361/0939	3582/0DFE
24	CLEAR LINES	2431/097F	3652/0E44
24	CLEAR ATTR	2499/09C3	3720/0E88
25	CLEAR ADDRESS	2518/09D6	3739/0E9B
25	SCROLL WAIT FOR KEY	2535/09E7	NO EQUIVALENT
25	COPY COMMAND	2562/0A02	3756/0EAC
26	COPY BUFFER	2595/0A23	3789/0ECD
26	CLEAR PRINTER BUFFER	2613/0A35	3807/0EDF
26	COPY LINE	2634/0A4A	3828/0EF4
27	EDITOR	2690/0A82	3884/0F2C
28	ADD CHARACTER	2791/0AE7	3969/0F81
28	EDIT KEYS TABLE	2822/0B06	4000/0FA0
28	EDIT KEY	2831/0B0F	4009/0FA9
29	CURSUR DOWN EDITING	2905/0B59	4083/0FF3
29	CURSUR LEFT EDITING	2925/0B6D	4103/1007
29	CURSUR RIGHT EDITING	2930/0B72	4108/100C
30	DELETE EDITING	2939/0B7B	4117/1015
30	EDIT IGNORE	2948/0B84	4126/101E
30	ENTER EDITING	2954/0B8A	4132/1024
30	EDIT EDGE (MARGIN)	3967/0B97	4145/1031
30	CURSUR UP EDITING	3007/0BBF	4185/1059
31	EDIT SYMBOL	3036/0BDC	4214/1076
31	EDIT ERROR	3045/0BE5	4223/107F
31	CLEAR SPACE	3069/0BFD	4247/1097
31	KEYBOARD INPUT	3086/0COE	4264/10A8
32	LOWER SCREEN COPYING (ECHO)	3203/0C83	4381/111D
33	SET HL & SET DE	3318/0CF6	4496/1190
33	DESLUG	3341/0D0D	4519/11A7

EXECUTIVE ROUTINES

34	NEW COMMAND	3357/0D1D	4543/11B7
34	INITALIZE	3377/0D31	4555/11CB
34	RAM CHECK	3392/0D40	4570/11DA
35	NEW	3458/0D82	NO EQUIVALENT
36	MAIN EXECUTION LOOP	3624/0E28	4770/12A2
38	REPORT MESSAGES	3941/0F65	5009/1391
40	MAIN ADD	4440/1158	5469/155D
40	INITIAL CHANNEL INFO	4522/11AA	5551/15AF
41	INITIAL STREAM INFO	4545/11C1	5574/15C6
41	WAIT FOR KEY	4559/11CF	5588/15D4
41	INPUT ADD	4577/11E1	5606/15E6
41	MAIN PRINTING	4586/11EA	5615/15EF
42	CHANNEL OPEN	4656/1230	5633/1601
42	CHANNEL FLAG	4680/1248	5653/1615
43	CHAN CODE LOOKUP TABLE	4755/1293	5677/162D
43	CHAN K FLAG	4762/129A	5684/1634
44	CHAN S FLAG	4776/12A8	5698/1642
44	CHAN P FLAG	4780/12AC	5709/164D
44	ONE SPACE	4792/12B8	5714/1652
44	MAKE ROOM	4795/12BB	5717/1655
44	POINTERS	4810/12CA	5736/1664
44	POINTERS (CART)	4812/12CC	NO EQUIVALENT
45	COLLECT A LINE NUMBER	4894/131E	5775/168F

45	RESERVE	4909/132D	5790/169E
46	SET MIN(CLEAR EDIT LINE)	4927/133F	5808/16B0
46	RECLAIM EDIT LINE	4963/1363	5844/16D0
46	SEARCH (INDEXER)	4970/136A	5851/16DB
46	SEARCH (CART SYSTEM)	4980/1374	NO EQUIVALENT
47	CLOSE # COMMAND	5023/139F	5861/16E5
47	CLOSE-2	5054/13BE	5889/1701
47	SYS CONF CK FOR CLOSE	5080/13D8	NO EQUIVLENT
48	CLOSE STREAM LOOKUP TABLE	5127/1407	5910/1716
48	CLOSE STREAM	5133/140D	5916/171C
48	STREAM DATA	5135/140F	5918/171E
49	OPEN # COMMAND	5162/142A	5942/1736
49	OPEN-2	5221/1465	5981/175D
50	CALL E-ROM	5256/1488	NO EQUIVALENT
51	OPEN STREAM LOOKUP TABLE	5319/14C7	6010/177A
51	OPEN K	5326/14CC	6017/1781
51	OPEN S	5330/14D2	6021/1785
51	OPEN P	5334/14D6	6025/1789
	CAT, ERASE, FORMAT, MOVE		6035/1793
51	LIST & LLIST COMMANDS	5345/14E1	6037/1795
52	LLIST ENTRY	5441/1541	6133/17F5
52	LIST ENTRY	5445/1545	6137/17F9
53	PRINT A WHOLE BASIC LINE	5537/15A1	6229/1855
54	SKIP SLUG	5634/1602	6326/18B6
54	PRINT A FLASHING CHAR	5645/160D	6337/18C1
54	PRINT THE CURSOR	5677/162D	6369/18E1
55	FIND NEXT LINE	5723/165B	6415/190F
55	PRINT CHAR IN BASIC LINE	5745/1671	6437/1925
56	LINE ADDRESS	5846/16D6	6510/196E
56	COMPARE LINE #'S	5864/16E8	6528/1980
56	FIND EACH STATEMENT	5872/16F0	6536/1988
57	FIND NEXT ONE(LINE/VAR)	5920/1720	6584/19B8
57	LENGTH DIFFERENCE	5957/1745	6621/190D
57	RECLAIMING (DELETE)	5965/174D	6629/19E5
58	EDIT LINE #	5992/1768	6651/19FB
58	REPORT AND LINE # PRINT	6024/1788	6683/1A1B

CARTRIDGE ROUTINES

59	AROS INITIALIZATION	6069/17B5	NO
59	AROS GET A LINE	6095/17CF	EQUIVA-
59	AROS LINE	6122/17EA	LENTS
60	AROS NEXT	6143/17FF	
62	AROS	6342/18C6	

BASIC LINE AND COMMAND INTERPRETATION

63	SYNTAX OFFSET TABLE	6469/1945	6727/1A48
64	SYNTAX PARAMETER TABLE	6523/197B	6778/1A7A
66	MAIN PARSER (SYNTAX)	6695/1A27	6935/1B17
66	STATEMENT LOOP	6725/1A44	6952/1B28
67	SCAN LOOP	6805/1A95	6994/1B52
67	SEPARATOR	6834/1AB2	7023/1B6F
67	STATEMENT RETURN	6841/1AB9	7030/1B76
68	LINE RUN (EXECUTE)	6872/1AD8	7050/1B8A
68	LINE NEW	6882/1AE2	7070/1B9E
68	REM COMMAND	6912/1B00	7090/1BB2

68	LINE END	6921/1B09	7091/1BB3
68	LINE USE	6933/1B15	7103/1BBF
69	NEXT LINE	6951/1B27	7121/1BD1
69	CHECK END	6980/1B44	7150/1BEE
69	NEXT STATEMENT	6986/1B4A	7156/1BF4
69	COMMAND CLASS TABLE	7012/1B64	7165/OC01
70	COMMAND CLASSES 0,3 & 5	7024/1B70	7181/1C0D
70	JUMP ENTER	7033/1B79	7190/1C16
70	COMMAND CLASSES 1,2 & 4	7042/1B82	7199/1C1F
70	FETCH A VALUE	7045/1B85	7202/1C22
71	COMMAND CLASS 4	7119/1BCF	7276/1C6C
71	EXPECT NUMERIC/STRING EXP	7132/1BDC	7289/1C79
71	EXPECT 2 NUMBERS(CLASS 8)	7133/1BDD	7290/1C7A
71	EXPECT 1 NUMBER (CLASS 6)	7141/1BEC	7298/1C82
71	EXPECT EXPRESSION (10)	7151/1BEF	7302/1C8C
71	SET PERMANENT COLORS	7161/1BF9	7318/1C96
71	COMMAND CLASS 9	7209/1C29	7358/1CBE
72	COMMAND CLASS 12	7238/1C46	7387/1CDB
72	FETCH A #	7241/1C49	7390/1CDE
72	STOP COMMAND	7257/1C59	7406/1CEE
72	IF COMMAND	7259/1C5B	7408/1CF0
72	FOR COMMAND	7288/1C78	7427/1D03
74	LOOK IN PROGRAM	7464/1D28	7558/1D86
75	NEXT COMMAND	7509/1D55	7595/1DAB
76	READ COMMAND	7574/1D96	7660/1DEC
78	DATA COMMAND	7810/1E82	7719/1E27
78	PASS BY	7828/1E94	7737/1E39
78	RESTORE COMMAND	7837/1E9D	7746/1E42
78	RESTORE RUN	7882/1ECA	7749/1E45
79	RANDOMIZE COMMAND	7892/1ED4	7759/1E4F
79	CONTINUE COMMAND	7908/1EE4	7775/1E5F
79	GOTO COMMAND	7921/1EF1	7802/1E7A
79	POKE COMMAND	7946/1F0A	7808/1E90
79	GET TWO PARAMETERS	7951/1F0F	7813/1E85
79	FIND SINGLE INTEGER	7966/1F1E	7828/1E94
79	FIND DOUBLE INTEGER	7971/1F23	7833/1E99
80	RUN COMMAND	7979/1F2B	7841/1EA1
80	CLEAR COMMAND	7990/1F36	7852/1EAC
81	GOSUB COMMAND	8089/1F99	7917/1EED
81	TEST ROOM (CK SZ)	8123/1FBB	7942/1F06
	FREE MEMORY	SEE 10548	7962/1F1A
81	RETURN COMMAND	8148/1FD4	7971/1F23
82	PAUSE COMMAND	8171/1FEB	7994/1F3A
82	BREAK KEY?	8201/2009	8020/1F54
82	DEF FN COMMAND	8221/201D	8032/1F60
83	ON ERR COMMAND	8320/2080	NO EQUIVALENT
84	STICK COMMAND	8401/20D1	NO EQUIVALENT
85	SOUND COMMAND	8487/2127	NO EQUIVALENT
85	UNSTACK Z	8527/214F	8131/1FC3
85	LPRINT COMMAND	8533/2155	8137/1FC9
85	PRINT COMMAND	8537/2159	8141/1FCD
86	SET TOKEN FLAG	8569/2179	NO EQUIVALENT
86	PRINT A SEQUENCE	8574/217E	8159/1FDF
86	START A NEW LINE	8596/2194	8181/1FF5
86	PRINT ITEMS	8603/219B	8188/1FFC

87	END OF PRINTING(STR END?)	8676/21E4	8261/2045
87	PRINT POSITION	8685/21ED	8270/204E
87	ALTER STREAM	8719/220F	8304/2070
87	INPUT COMMAND	8747/222B	8329/2089
88	INPUT SEQUENCE	8811/226B	8385/20C1
90	INPUT ASSIGN	9059/2363	8633/21B9
90	INPUT CHANNEL K	9088/2380	8662/21D6
90	COLOR ITEMS	9099/238B	8673/21E1
91	COLOR CHANGE	9147/23BB	8721/2211
92	HIFLASH	9245/241D	8819/2273
93	BORDER COMMAND	9278/243E	8852/2294
93	RESET COMMAND	9300/2454	NO EQUIVALENT
94	RESET PARAMETERS	9368/2498	NO EQUIVALENT
94	NEW DEVICE	9426/24D2	NO EQUIVALENT
95	SAVE, LOAD, VERIFY, MERGE	9543/2547	NO EQUIVALENT
96	VIDEO 2 SCREEN	9570/2562	NO EQUIVALENT
96	SKIP IT (CART)	9577/2569	NO EQUIVALENT
97	PASS TO BANK 254	9657/25B9	NO EQUIVALENT
97	CATALOG COMMAND	9672/25C8	6035/1793
97	FORMAT COMMAND	9676/25CC	6035/1793
97	MOVE COMMAND	9680/25D0	6035/1793
97	ERASE COMMAND	9684/25D4	6035/1793
97	GARBAGE	9700/25E4	
98	PIXEL ADDRESS	9731/2603	8874/22AA
98	POINT	9764/2624	8907/22CB
98	PLOT COMMAND	9781/2635	8924/22DC
99	STACK TO BC	9824/2660	8967/2307
99	STACK TO A	9837/266D	8980/2314
99	CIRCLE COMMAND	9849/2679	8992/2320
100	DRAW COMMAND	9947/26DE	9090/2382
104	INITIAL PARAMETERS	10198/27D6	9341/247D
105	LINE DRAW	10256/2810	9399/24B7

EXPRESSION EVALUATION

106	EXPRESSION	10324/2854	9467/24FB
106	SCAN QUOTE	10344/2868	9487/250F
106	SCAN 2 COORDINATES	10363/287A	9506/2522
107	SCREEN POSITION	10382/288E	9525/2535
108	FIND ATTR	10455/28D7	9600/2580
108	PI ROUTINE	10477/28ED	NO EQUIVALENT
108	STICK COMMAND	10488/28F8	NO EQUIVALENT
109	FREE COMMAND	10548/2934	SEE FREE MEMORY
109	SCANNING FUNCTION TABLE	10572/294C	9622/2596
109	SCANNING FUNCTION	10601/2969	9647/25AF
109	SYN-QUOTE	10609/2971	9651/25B3
112	SYN-VARIABLE	10887/2A87	9929/26C9
113	SYN-MAIN LOOP	10994/2AF2	10036/2734
114	TABLE OF OPERATORS	11091/2B53	10133/2795
114	TABLE OF PRIORITIES	11118/2B6E	10160/27B0
114	SCAN FOR FN	11131/2B7B	10173/27BD
117	FN SKIPOVER	11369/2C69	10411/28AB
118	LOOK IN VARS(FIND VAR)	11376/2C70	10418/28B2
119	STACK FUNCTION ARGUMENT	11535/2D0F	10577/2951
119	STACK VARS	11604/2D54	10646/2996
122	SLICING	11792/2E10	10834/2A52

123	STACK STORE	11887/2E6F	10929/2AB1
123	INTEGER EXPONENT	11914/2E8A	10956/2ACC
123	LOAD DE, DE+1	11948/2EAC	10990/2AEE
124	GET HL*DE	11954/2EB2	10996/2AF4
124	LET COMMAND	11965/2EBD	11007/2AFF
126	LET ENTER	12132/2F64	11174/2BA6
126	LET SUBROUTINE CONTINUED	12140/2F6C	11183/2BAF
126	LET STRING	12164/2F84	11206/2BC6
127	LET FIRST	12200/2FA8	11242/2BEA
127	GET PARAMETERS	12207/2FAF	11249/2BF1
127	DIM COMMAND	12224/2FC0	11266/2C02
129	ALPHA NUM	12358/3046	11400/2C88
129	DECIMAL TO FP	12377/3059	11405/2C8D
130	E FORMAT	12457/30A9	11499/2CEB
130	NUMERIC	12505/30D9	11547/2D1B
130	STACK DIGIT	12512/30E0	11555/2D22
130	STACK A	12518/30E6	11560/2D28
131	STACK BC	12521/30F9	11563/2D2B
131	INTEGER TO FP	12537/30F9	11579/2D3B

ARITHMETIC ROUTINES

131	E FORMAT TO FP	12557/310D	11599/2D4F
132	INTEGER FETCH	12605/313D	11647/2D7F
132	INTEGER STORE	12618/314A	11660/2D8C
132	FLOATING POINT TO BC	12640/3160	11682/2DA2
133	LOG (2^A) EXPONENT	12671/317F	11713/2DC1
133	FLOATING POINT TO A	12691/3193	11733/2DD5
134	PRINT A FLOATING POINT #	12705/31A1	11747/2DE3
138	CA = 10*A + C	13130/334A	12171/2F8B
139	PREPARE TO ADD	13146/335A	12187/2F9B
139	FETCH 2 #'S	13177/3379	12218/2FBA
140	SHIFT ADD END	13212/339C	12253/2FDD
140	SHIFT 4/5	13242/33BA	12283/2FFB
140	ADD BACK	13251/33C3	12292/3004
141	SUBTRACTION (3)	13262/33CE	12303/300F
141	ADD (15)	13266/33D3	12308/3014
143	HL*DE	13416/3468	12457/30A9
143	PREPARE TO MULT/DIVIDE	13439/347F	12480/30C0
143	MULTIPLY (4)	13499/3489	12490/30CA
146	DIVISION (5)	13678/356E	12719/31AF
148	INTEGER TRUCATION->0 (58)	13779/35D3	12820/3214
149	RESTACK 2 #'S	13906/3652	12947/3293
149	RESTACK FP (61)	13910/3656	12951/3297

FLOATING POINT CALCULATOR

150	CONSTANT TABLE	13956/3684	12997/32C5
150	ADDRESS TABLE	13974/3696	13015/32D7
151	CALCULATE	14106/371A	13147/335B
152	DELETE (2)	14176/3760	13217/33A1
152	SINGLE OPERATION (59)	14177/3761	13218/33A2
153	TEST 5 SPACE	14195/3773	13236/33B4
153	MOVE FP #(DUPLICATE) (49)	14207/377F	13248/33C0
153	STACK LITTERALS (52)	14213/3785	13254/33C6
154	SKIP CONSTANTS	14262/37B6	13304/33F7
154	MEMORY LOCATION	14277/37C5	13318/3406

154	GET FROM MEMORY (EO Etc)	14286/37CE	13327/340F
154	STACK A CONSTANT (AO Etc)	14298/37DA	13339/341B
154	STORE IN MEMORY (CO Etc)	14316/37EC	13357/342D
155	EXCHANGE (1)	14331/37FB	13372/343C
155	SERIES GENERATOR (86 Etc)	14344/3808	13385/3449
155	ABSOLUTE MAGNITUDE (42)	14377/3829	13418/346A
155	UNARY MINUS (27)	14381/382D	13422/346E
156	SIGN (41)	14417/3851	13458/3492
156	IN (44)	14436/3864	13477/34A5
156	PEEK (43)	14443/386B	13484/34AC
156	USR FUNCTION (46)	14450/3872	13491/34B3
157	CALL USR BANK	14466/3882	NO EQUIVALENT
158	USR STRING (25)	14551/38D7	13500/34BC
158	TEST ZERO	14596/3904	13545/34E9
159	GREATER THAN ZERO (55)	14612/3914	13561/34F9
159	NOT (48)	14620/391E	13569/3501
159	LESS THAN ZERO (54)	14625/3921	13574/3506
159	ZERO OR ONE	14630/3926	13579/350B
159	OR (7)	14646/3936	13595/351B
159	NUMBER AND NUMBER (8)	14655/393F	13604/3524
159	STRING AND NUMBER (16)	14664/3948	13613/352D
160	COMPARISONS (9-14, 17-22)	14678/3956	13627/353B
161	STRING CONCATENATION (23)	14775/39B7	13724/359C
161	STACK POINTERS	14810/39DA	13759/35BF
162	CHR\$ FUNCTION (47)	14820/39E4	13769/35C9
162	VAL/VAL\$ FUNCT (24, 29)	14841/39F9	13790/35DE
162	STR\$ FUNCTION (46)	14906/3A3A	13855/361F
163	READ IN (26)	14944/3A60	13893/3645
163	CODE (28)	14980/3A84	13929/3669
163	LEN (30)	14991/3A8E	13940/3674
163	DECREASE COUNT (DJNZ) (53)	14997/3A95	13946/36A7
164	JUMP (51)	15009/3AA1	13958/3686
164	JUMP IF TRUE (0)	15018/3AAA	13967/368F
164	END FP CALC (56)	15030/3AB6	13979/369B
164	MODULUS (50)	15035/3ABB	13984/36A0
165	INTEGER FUNCTION (39)	15050/3ACA	13999/36AF
165	EXPONENTIAL (38)	15071/3ADF	14020/36C4
166	NATURAL LOGARITHM (37)	15150/3B2E	14099/3713
167	REDUCE ARGUMENT (57)	15262/3B9E	14211/3783
168	COSINE (32)	15301/3BC5	14350/37AA
168	SINE (31)	15312/3BD0	14263/37B7
168	TANGENT (33)	15349/3BF5	14298/37DA
168	ARCTANGENT (36)	15357/3BFD	14306/37E2
169	ARCSINE (34)	15438/3C4E	14387/3833
169	ARCCOSINE (35)	15454/3C5C	14403/3843
170	SQUARE ROOT (40)	15461/3C65	14410/384A
170	EXPONENTATION (6)	15468/3C6C	14417/3851
170	TAPE MESSAGE TABLE	15497/3C89	2465/09A1
171	CHARACTER TABLE	15616/3D00	15616/3D00

FUNCTION DISPATCHER

173	XFER DISPATCHER	24576/6000	NO
175	FUNCTION DISPATCHER	25088/6200	EQUIVALENTS
176	INTERRUPTABLE RESTART	25262/62AE	
177	NONMASKABLE INTERRUPT	25351/6307	

177	NONMASKABLE INTERRUPT	25351/6307
177	BS MAX BANK	25365/6315
177	GET WORD	25365/6316
178	PUT WORD	25403/633D
178	WRITE BS REGISTER	25436/635C
179	READ BS REGISTER	25517/63AD
180	GET STATUS	25605/6405
181	GET CHUNK	25677/644D
181	GET BANK #	25694/645E
182	BANK ENABLE	25753/6499
184	SAVE BANK STATUS	25886/651E
184	RESTORE STATUS	25930/654A
185	GOTO BANK	25970/6572
185	BANK STATUS STACK	25997/658D
185	BANK STATUS STK POINTER	26062/65CE
185	CALL BANK	26064/65D0
187	MOVE BYTES	26252/668C
188	CREAT BITMAP	26344/66E8
188	XFER BYTES	26402/6722
191	DISPATCH SOURCE	26647/6817

EXTENDED ROM ROUTINES

192	E-STARTUP	E0000/0000	NO
192	E-ERROR	E0008/0008	EQUIVALENTS
192	E-INTERRUPT RESTART	E0056/0038	
192	E-STARTUP CONTINUED	E0073/0049	
192	SET HORIZONTAL REGISTER	E0079/004F	

CASSETTE HANDLING ROUTINES

193	SAVE BYTES	E0104/0068	1218/04C2
194	SAVE/LOAD RETURN	E0229/00E5	1343/053F
194	LOAD BYTES	E0252/00FC	1366/0556
196	READ BIT AND READ EDGE	E0393/0189	1507/05E3
196	SAVE/LOAD/VERIFY/MERGE	E0427/01AB	1541/0605
206	VERIFY CONTROL	E1423/058F	1595/07CB
206	LOAD A DATA BLOCK	E1478/05C6	2050/0802
206	LOAD CONTROL	E1484/05CC	2056/0808
209	MERGE CONTROL	E1765/06E5	2230/08B6
211	MERGE LINE OR VARIABLE	E1945/0799	2348/092C
213	SAVE CONTROL	E2129/0851	2416/0970
214	CALL WAIT FOR KEY	E2218/08AA	NO EQUIVALENTS
215	EXIT WITH ERROR	E2265/08DA	
215	EXTENDED INITIALIZATION	E2279/08E7	
217	FIND CHAN ADDR	E2458/099A	
218	BUILD SYS CONF TABLE	E2548/09C2	
220	SET END MARKER	E2772/0AD4	
220	INTERRUPTABLE RESTART	E2779/0ADB	
223	RESET BS REG	E3025/0BD1	
223	GET USR BANK	E3103/0C1F	
224	RESET SYS CONF	E3148/0C4E	
226	SET END MARKER-2	E3317/0CF5	
226	CLEAR SYS CONF	E3323/0CFA	
227	INCREASE BANKS	E3428/0D64	
227	CLEAR MAX BANKS	E3460/0D84	
228	OPEN D-FILE	E3504/0DB0	
229	CLOSE D-FILE	E3623/0E27	

230	CHANGE VIDEO MODE	E3726/0E8E
232	PASSING	E3907/0F43
233	SET GOSUB	E3965/0F7D
233	GOTO BANK	E3978/0F8A
233	CALL BANK	E3993/0F99
234	FIX BL TABLE	E7424/2900
235	FUNCTION DISP JUMP TABLE	E7900/30DC
238	ERROR LIST	
239	FLAG LIST	